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EDITORIAL.

THE DEEPEST gold mine is still to be credited to Bendigo (in Victoria, Australia), although the time is coming when the Rand (South Africa) will claim the record. For the present the Victoria Quartz mine, at Bendigo, has probed deeper into the earth than any other digging after gold; work is now going on in this mine at 3,950 ft., a winze having been sunk 250 ft. below the lowest level, at 3,700 ft. Among its neighbors the Victoria Quartz mine has the New Chum Railway, with work proceeding at 3,856 ft., and the New Chum Consolidated, 3,583 ft. The celebrated '180' mine, the property of Mr. George Lansell and long the deepest gold mine in the world, is being exploited at 3,250 ft., although the shaft itself is 200 ft. deeper.

OUR ESTEEMED contemporary, *Metallurgie*, edited by that distinguished specialist, Dr. W. Borchers, of Aachen, has reproduced a large part of the discussion on pyrite smelting which has appeared in our columns. This is a compliment which is cordially appreciated. The letters recently published have illuminated the subject in a practical fashion and Dr. Peters' philosophic review of the material afforded by the successful metallurgists who have contributed to this JOURNAL will, we feel assured, be appreciated by those who know metallurgy as the art of making money out of ore.

THE ARTICLE on custom smelting in northern Mexico given on another page, will be read with interest. Mr. J. W. Malcolmson is particularly well informed on the matter and discusses present conditions without prejudice. He emphasizes the effect of the scarcity of lead ores in raising the charges for treatment on silicious material and the recent growth in favor of pyrite smelting, which permits of the collection of the gold and silver in ores containing only a small percentage of copper, and no lead. Mexico is repeating the experience of the Rocky mountain region, where matte smelters did outpost duty for the big valley smelters, serving, like concentrating mills, to bring the output down to a bulk such as would permit of convenient transport to the central reduction plants.

THE BLASTING of placer ground preparatory to dredging constitutes an interesting development in mining practice, as is shown by the article by Mr. O. B. Finn, appearing elsewhere in this issue. The use of dynamite in dredging will scarcely be found necessary where powerful dredges of recent design are available, but under certain conditions, with tight ground and a light dredge, which must be accepted as it is, this method is likely to prove helpful. Another method of loosening tight gravel banks is to furrow the surface and permit water to exercise its disintegrating effects; this will apply to ground the top of which stands well above the surface of the water in which the dredge floats, a condition which is not exceptional.

A WORKING MINE as an adjunct to a mining school is a new development in this country, although an established relation in some of the most celebrated schools of mines in Europe. Professor Keyes describes, in this issue, the plan carried out by the New Mexico School of Mines. It has evidently been done in a thorough manner, and on a practical basis. The arrangements go a good deal further than those of Columbia, Yale and Harvard; the mining classes at these institutions having only gone so far as to lease a mine in Colorado for the term of the summer school.

Our readers will have their own opinions as to the benefits accruing from this particular development in mining education. We do not expect any great results, while recognizing certain good features in these attempt to unite academic teaching to practical training. A smattering of the latter is worse than an entire lack of it, and it is a mistake to suppose that schools of mines make mining engineers; they only prepare them to become such by subsequent apprenticeship amid the actualities of life.

THE SOUTHERN PACIFIC Railroad Company has been gradually changing from coal to oil fuel, until at the present time 780 out of 1,350 locomotives owned by the company are burning oil. The 300 engines used on the line between Sacramento and Ogden, and those on the Oregon division north of Ashland, continue to use coal, as it can be obtained cheaper than oil along that portion of the railroad. The change from coal to oil is comparatively simple, and should the oil supply run short, or increase in price to a point which would make a return of solid fuel profitable, the burning of coal could be resumed in a short time. Oil has been substituted for coal fuel in the company's shops at Sacramento also.

In this connection a story is told which proves that managers of a great railroad company are not always prophets. The Southern Pacific had a large land grant from the Government in the San Joaquin valley in California. Much of this land was considered worthless on account of its aridity, and was graded at very low prices. A few years ago the company sold a tract in the valley for $1,600. Some time later, when oil was discovered in Kern county, it was found that this tract was the center of the great Kern river oil-field. The company tried to buy it back, but the price asked was $4,000,000, and no bargain was made. A contract was made, however, with the owners to furnish oil to the railroad, and the company is now paying about $1,500 per day for oil from the very tract sold originally for $1,600. It seems somewhat strange that the sale should have been made, since oil had already been found in the valley at the time, but apparently the railroad company's land department had not much geological talent at its command.

MINING AT THE ST. LOUIS EXPOSITION.

We give up a large part of our space this week to an account of the display made by the mining and metallurgical interests of the country in the Louisiana Purchase Exposition at St. Louis. The descriptions are necessarily condensed, in order to bring them within the limits of a single number of this JOURNAL; but we hope that they will serve as a guide to such of our readers as may visit St. Louis, and perhaps as an inducement to some of them to make the journey there.

The Exposition is the culmination of a series of world's fairs, and doubtless exceeds in extent and in its approach to completeness, anything we have ever had in this country; probably any ever collected in any country. In the department of mines and metallurgy, in which we are specially interested, there is certainly a greater variety of exhibits and a better arrangement than has heretofore been seen. There are some defects and omissions, perhaps, but they are due to the mistaken policy of certain corporations, and not to the officers in charge of the exhibit, who have worked hard to produce the best results, and whose good judgment and unsparing exertions are evident in the Mines Building and its contents.

It is difficult in such a collection to make the purely educational element as prominent as it should be, if the full value of the work done is to be realized. Much has been done in this direction, and it will be hard for any mining man—or even for an outsider—to visit the Exposition without seeing and learning something new. It is true that there is nothing in the Mining Department which compares with the two exhibits made by the Pennsylvania and the Baltimore & Ohio railroads in the Transportation Building; one showing the present conditions of railroad work, and the other the history of their growth and development. This, however, was due partly to the difficulty of concentrating a mines exhibit, as can be done with that of a railroad; but much more to the unaccountable refusal of one or two great corporations to do their share. An exhibit illustrating the development of iron metallurgy and the processes now employed, for instance, could have been made by the United States Steel Corporation, and would have had great and permanent value. A similar collection illustrating copper metallurgy would also have been of almost equal worth.

We do not want, however, to insist upon these points. It is sufficient to say that the Mines Building and its attached departments at St. Louis contain enough to interest and instruct the visitor for as long a time as he can give to their inspection. No one will regret a visit to St. Louis; and we believe that everyone who does go there will admit the greatness and success of the Louisiana Purchase Exposition.

AN IMPORTANT DECISION.

If legitimate mining is to be freed from the barnacles and slime of fraud, it will be done best by the activity of the post office department in protecting the mails from improper use and by the decisions of the courts, when the victims of wrong-doing appeal to them for redress. The decision in the case of Lindholm v. the Horseshoe Mining Company should benefit not only the mining region of the Black Hills in South Dakota, where the litigation arose, but the mining industry of the whole country. The plaintiff brought suit to recover money paid on stock; in order to rescind the contract of sale and recover the purchase price, he had to prove that the defendant had made false representations, that these representations were not actually believed by the defendant, on reasonable grounds, to be true, and that such representations were made with the intent that they should be acted upon by the plaintiff to his damage. These claims were substantiated, as the verdict indicates. The misrepresentations which formed the basis of the action were made orally and in letters by the general manager of the mining company; they were repeated in a prospectus issued by the defendant company. The Court charged the jury that "a representation is false in the contemplation of law, as well as of morals, if it is false in a plain practical sense; that is to say, if it would be apt to create a false impression to the average mind." Similarly the suppression of facts is to be considered misrepresentation. "The prospectus of a company must be an honest, candid and straightforward document; it cannot be untrue, nor must it be misleading." These words, backed by the decision of a jury, are calculated to be of great service to the honorable business of company organization, and they are a forceful blow against the ras-

calities which masquerade as mining promotions.

Another important matter raised in the action to which we refer is the legal standing of companies or syndicates which do not own mining property but organize companies and sell stock just as if they did own them. The Court stated: "A mining company which holds mining property under an option to purchase the same, upon the payment of certain sums at certain dates, does not hold such property under a perfect title or a perfect legal title; neither does a company hold lands under a perfect title, or perfect legal title, where it holds them under an agreement to execute a deed to it, upon its executing in return a mortgage securing the balance of unpaid purchase money." This described the status of the Horseshoe Mining Company, and it would describe equally well the position of many companies which, without security of title, offer shares to the investing public. The subsequent acquisition of a perfect title to mining property by expending for that purpose the money secured from the sale of stock does not constitute a defense. This again is an interpretation which appears to us to be just and practical; it would bear heavily upon many flotations which have been based on an option from the vendor of the mine, followed by inflated returns which hastened the sale of shares in a company controlled by the vendor, until such time as his shares had been taken over. An example of this dangerous method is afforded by a famous mine at Cripple Creek which was floated in London and got into serious trouble by reason of this very practice, now animadverted by the United States Circuit Court of South Dakota.

THE PERSEVERANCE FIASCO.

The disclosure of a big discrepancy in the estimated ore reserves of the Great Boulder Perseverance mine has attracted the attention of professional men, not only in Western Australia, where the mine is, and in London, whence it is managed, but also in this country, where Mr. Ralph Nichols, the engineer blamed for the fiasco, is well and honorably known.

While Mr. Nichols was nominally manager of the mine he also acted as advisory engineer to the directors who controlled the Perseverance, and in that capacity he has recently been sent by them to make inspections in other countries. During the past year he was away from the mine a great deal, and in his absence the actual administration was entrusted to his subordinates. Relying on the information furnished by them, he estimated the ore reserves at about 400,000 tons, containing about 500,000 ounces of gold. When Bewick, Moreing & Co. were appointed general managers lately, they immediately set about to re-sample the mine, to check the estimates. As a result of an exhaustive examination, they now find that the reserves amount to 139,000 tons, averaging 14¼ dwt. per ton, so that the discrepancy in the net profit assured is £1,200,000.

Two reasons are given as explaining the discrepancy. In the first place, there has been a continual falling off in the grade of the ore in various blocks as stoping has progressed; of this Mr. Nichols was not aware. Secondly, there is reason to believe that he has been the victim of disloyalty among his staff, for there has been big bear selling of the shares from Australia for fully six months past, and rumors of impending trouble had begun to leak out some time before the facts were known to the public.

To make the story complete, it is necessary to refer to the episode of the Boulder Deep Levels, which occurred last month. Mr. Nichols is manager of this mine also. During the period in May, which elapsed between his departure from London and his arrival in Australia, startling statements were made regarding new developments underground. When he reached the mine, Mr. Nichols himself exploded the bubble and exposed it as a a fraud of the worst kind. In this matter, as in the Perseverance case, Mr. Nichols acted with unquestionable integrity and the disastrous results for which he is largely blamed are due to conditions which do not affect his honor, but are the direct consequence of methods to which we will now turn, in the hope that the recent experience at Kalgoorlie may not be wasted.

Several lessons are taught by such episodes: Directors do wrong in using the services of the mine manager to make inspections in distant regions; compelling him thereby to delegate his duties to subordinates. Mr. Nichols' frequent visits to this country, while he was described as manager of a mine in Australia, had provoked comment long before the distressing consequences of his absence from Kalgoorlie were known. Another lesson is the old one that in rendering such important information as the estimate of ore reserves in a big gold mine, no engineer should be satisfied with second-hand data. Actual presence on the spot and oversight of the sampling is necessary. Members of the profession, in these matters, will do well to be less complacent to their directors; they must realize that their reputation will be sacrificed without the least hesitation, should compliance with the requests of the board lead to disaster. Individual directors are usually honorable, but collectively they have been known to do things that any gentleman would be ashamed of. Finally, the Perseverance fiasco illustrates that it is a mistake for companies to gain credit from the reputation of a well-known man, and for that man to lend his reputation to the company, unless it is accompanied by close attention to details of the actual management of the mine. For engineers of high repute to assume responsibility for the direction of a mine while absent from it most of the time, or while delegating their duties to subordinates, is alike dangerous to the mine and the man concerned. Mines are not run by heliographing, or even wireless telegraphy; actual touch with affairs on the spot is imperative. We hope, therefore, that this untoward incident will intensify a sense of personal responsibility among professional men, all of whom will be quick to recognize that Mr. Ralph Nichols has been the victim of circumstances. We hope at an early date to publish his own explanation of the case; this is now on the way from Australia.

A HALF-YEAR'S DIVIDENDS.

There were 132 incorporated mines and metallurgical companies in the United States that reported to the ENGINEERING AND MINING JOURNAL dividends amounting to $64,891,176 for the six months ending June 30. Compared with the corresponding period last year, there is shown a falling off of three in the number of companies reporting, and of $16,252,775 in the profits divided. The principal cause explaining this large decrease was the suspension of dividend payments by some of the more important industrial combinations that had guaranteed at the time of organization from 5 to 7 per cent annually. To some extent also the lower prices of copper and spelter this year have affected certain low-grade mines that paid dividends in 1903. On the other hand, the improvement in the silver and lead markets has permitted the payment of quarterly dividends by the smelter trust at the rate of 5 per cent per annum on the common stock and 7 per cent on the preferred.

In detail the dividends paid in the half-year just closed are given below:

Property.	Number of Companies.	Dividends Paid.
Copper	14	$10,332,546
Gold, silver and lead	62	8,650,545
Quicksilver	1	90,000
Zinc	6	623,941
Total metal mines	83	$19,697,032
Coal and coke	17	3,337,625
Iron and steel	6	14,529,243
Oil and gas	19	25,290,726
Miscellaneous	7	2,036,550
Total industrial	49	$45,194,144
Grand total	132	$64,891,176

Of these dividends 26 were regular monthly payments, principally by mines in Utah and Colorado, that yielded as high as 40 per cent per annum. Thirty-eight payments were made quarterly, chiefly on the preferred stock of the industrial combinations, which declare at the rate of 7 or 8 per cent per annum. Of the remaining 68 companies, only eight pay semi-annual dividends, while the others distribute profits at irregular intervals or have made their first payment.

The two largest dividend payers in the United States are the Standard Oil Company, controlled by a few people, who have received $23,280,000, or 24 per cent, and the United

States Steel Corporation, which has paid $12,610,994, or 3.5 per cent for the half-year to thousands of its preferred shareholders. Foremost in the metal mines list stands the Calumet & Hecla copper mine, in Michigan, with $2,000,000, or 80 per cent, on the par of $25 per share for the six months, paid to a small number of stockholders. Calumet & Hecla stock is now quoted at 18 times its par value, and at $450 yields a fraction over 11 per cent per annum in dividends. Its rival, Amalgamated, with a capitalization 62 times greater, paid only $1,538,860, or 1 per cent, on a par value of $100 for the half-year to over 18,000 stockholders. Amalgamated shares are selling around half their par value, and at $50 yield only 4 per cent in dividends annually.

The gold, silver and lead properties pay the larger number of dividends, usually in small instalments. Among the better paying mines are the Camp Bird, of Ouray, Colo., which, up to the end of June, has paid at the rate of 20 per cent per annum on par of $5; Silver King, of Utah, 40 per cent on par of $20; Daly-West, of Utah, 24 per cent on $20, and Portland, of Cripple Creek, Colo., 24 per cent on $1. It is interesting to add that the two best paying low-grade gold mines are the Homestake, of South Dakota, which distributes 3 per cent in dividends annually on a capitalization of $21,840,000, and the Alaska-Treadwell, on Douglas Island, Alaska, which will divide this year 7.5 per cent on a capital of $5,000,000. The magnitude of these two low-grade propositions will be better appreciated when it is learned that the Homestake mine milled, in the year ending June 11, 1903, a total of 1,279,075 tons ore, which yielded an average of $3.54 per ton in bullion, while the Alaska-Treadwell, in the year ending May 30, 1903, stamped 756,325 tons, with an average assay value of $2.09 per ton.

The quicksilver mine reporting dividends is situated in California, and of the six zinc properties the New Jersey Zinc Company is credited with the largest payment, $600,000, being at the rate of 12 per cent per annum.

The industrial dividends, led by iron and steel and oil, still constitute the bulk of the payments, owing to the heavy capitalization of the combinations. The coal and coke properties, with few exceptions, are not yielding as well as a year ago, as a result of the present slackening of activity in all lines of manufacturing and particularly in the iron and steel trades.

In addition to the dividends enumerated above, there have been paid $1,158,450 by five Mexican, and $132,000 by two Central American gold, silver and copper mines in which Americans are interested.

Upon the whole, the showing made by the first half of 1904 is a very fair one, and it is quite possible that it may be equaled, if not exceeded, in the second half of the year, now beginning.

MARKET CONDITIONS.

July 6.

The broken week, in which the holiday extended practically over three days, and the opening of the vacation season have combined to make business very quiet in the metal markets.

In copper only a moderate business is being done for domestic consumption; but foreign buying is fair. Business in Europe seems to be on a very good scale, and there is a steady demand for metal, which promises to continue. Tin continues to fluctuate on a small current consumptive demand. Lead shows no changes, either in price or in the volume of business done. Spelter, however, holds its own well, both quotations and sales being better than had been anticipated. The Joplin ore producers have generally agreed to shut down for two weeks, beginning July 2. During that period, it is expected that the surplus stocks of ore will be closed out.

Silver is steady, in fact rather strong, and the price has improved, chiefly on account of good buying for India. There is also an element of speculation in the market.

The iron markets are very dull, and business is being done only on the basis of current needs. It is admitted that a good deal of business is in sight for the fall and winter, but just now no one wants to anticipate future requirements. Export business is on the increase, and some quiet work seems to have been done abroad, the results of which are beginning to show in the trade returns.

The western coal markets are quiet, local demand being small, while the lake trade has settled down into its regular course for the season.

The coal trade on the seaboard, both bituminous and anthracite, is also quiet, showing no material change from our last report.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

Because of their structure, their composition, their distinctive markings, and the remains of life which they contain, it is confidently inferred that most of the stratified rocks were originally laid down in beds beneath the sea.

The wedge work of ice in disrupting the rocks is due to the sudden expansion of water between 39° F. and the freezing point. Its effects are notable in mountain regions.

Aridity favors the disruption of rock by changing temperatures, because a rock surface becomes hotter in the day and cooler at night beneath a dry atmosphere than beneath a moist one.

In general, crystalline rocks are more subject to disruption by atmospheric agency, chiefly because they are made up of aggregates of crystals of different minerals which, under changes of temperature, expand and contract at different rates.

Two iron works in Spain, manufacturing coke by the Simon-Carves and Semet-Solvay processes, produced last year 5,017 tons of tar, which was sold to the distilleries at Elarrieta. These iron works also produced 1,753 tons of ammonium sulphate.

In 1903 Roumania produced 384,303 tons of petroleum. One hundred and five wells, principally in the Prahova district, were producing oil at the end of the year. Since 1868 there have been 34 companies formed to exploit the petroleum fields.

An amalgam, very convenient for stopping up holes that cannot be soldered easily, is made of the filings of an alloy of zinc 66 per cent and tin 34 per cent, kneaded with quicksilver in the hand into a stiff dough, squeezing out all the mercury possible. This amalgam should be pressed when first made into the cavity and allowed to harden. When hard it may be scraped or filed like the metal itself.

A method of mining which is probably unique in this field of industry is said to be employed in the diamond field of Paraguacu, Brazil. The river-bed deposits are worked, not by dredging or diverting the stream, but by diving-machines constructed somewhat like caissons. The miner works beneath the machine gathering the diamontiferous material into sacks lowered from above.

Greenockite, having 77.8 per cent cadmium and 22.2 per cent sulphur, is the only compound of cadmium of much importance in the arts. It makes a splendid and permanent yellow pigment (*jaune brillant*).

What is said to be one of the largest "go-devils" (oil-well shot) has recently been exploded in the Allegheny oil-field, in Pennsylvania, at a depth of 1,400 ft. The shot consisted of 400 quarts of nitro-glycerine loaded in 20 shells, each being 7 in. in diameter by 20 in. long. No sound was heard for fully a minute after the shot had been dropped into the well; then a column of water rose 75 ft. in the air, and was followed by a mighty roar and a discharge of oil, rock and water to a height of 150 feet.

Pumice, used for polishing, is a glassy lava, rendered porous by the escape of gas through its mass when in the state of fusion. The most important sources of supply are the Lipari Islands, off the coast of Italy, where the industry is centered in an extinct volcano, on which the accumulations of pumice reach in places a thickness of 650 ft.

Switzerland is one of the few countries of Europe not endowed with important mineral resources. Aside from a few small iron mines it has almost no deposits of metallic minerals of economic value. There are two anthracite mines in the country which yield from 1,500 to 2,000 tons of coal annually, and a few thousand tons of lignite are produced from deposits near Zurich and Lausanne. The quarrying industries are somewhat more important; cement, gypsum and lime are the principal materials quarried.

DISCUSSION

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of the ENGINEERING AND MINING JOURNAL.

MINE VALUATION.

The Editor:

Sir:—In your issue of June 9, Mr. Stephenson takes very kindly notice of my contribution on mine valuation, but I regret that he has misunderstood one matter, from possible lack of clearness on my part. In the example which I gave of 15 West Australian mines having a profit in sight of £10,500,000, I stated that these mines were valued by the *London Market* (the combined share-value at the day's quotations) at £14,500,000. I further stated that on the basis of the school of proportional valuers, the £14,500,000 would be about the correct figure. I also showed that it would be necessary for these deposits to extend in depth only 480 ft., to return this £14,500,000, and 6 per cent. interest. The whole *raison d'etre* of this example was to show that although such methods of valuation might quite well apply to the whole group as matters of average, yet they could not apply to the real problem, that is, the valuation of the individual mine.

Mr. Stephenson calls into question the soundness of £14,500,000 as the value of this group, and as the result of his re-calculation he concludes that they are worth only £4,500,000. Mr. Stephenson overlooks two most essential factors in arriving at the basis of calculation: First, that these mines are now fully equipped, and, second, that the £10,500,000 profit in sight only represents a 3½ years' ore-supply for this equipment. It is unnecessary to consider £2,000,000 for equipment purposes, and I am at a loss to know from what data Mr. Stephenson assumed a life of 30 years in his calculations. If we follow Mr. Stephenson's example and add £10,000,000 for the further profit of the group (for what reason I know not), the present capital value of these mines, after paying 10 per cent per annum over the whole period necessary to exhaust the quantity of ore thus represented, together with the redemption of capital during this period, then the present value of these mines would be £14,600,000, instead of £4,500,000, as arrived at by Mr. Stephenson. I hope I may not be misunderstood as putting forward even these figures as a basis of valuation, for, as said above, my whole object was to point out the futility of averages as applied to mine valuation.

H. C. HOOVER.

London, June 21, 1904.

NICKEL ASSAY.

The Editor:

Sir.—In your issue of June 23, at the close of a paragraph entitled 'Nickel Assay,' it is stated that with copper, zinc and manganese present, the potassium cyanide titration method for nickel would be useless. The method which I have frequently used with success in the analysis of German silver could be readily adapted to the analysis of nickel ores containing copper and zinc. The method, in brief, is as follows:

Dissolve the sample in nitric acid, make ammoniacal, and barely acidify with sulphuric acid. Heat to about 90°, add 10 c.c. sulphurous acid solution and two grams ammonium sulphycyanate. The copper is precipitated as cuprous sulphycyanate, white. It is filtered off and washed, and can straightway be determined by any one of several methods. The filtrate, free from copper, is again rendered ammoniacal, and faintly acidified with citric or, preferably, formic acid. Pass hydrogen sulphide in the cold for about 10 minutes. The precipitated zinc sulphide should be white, indicating the absence of nickel sulphide. Filter, dissolve, precipitate in dilute hydrochloric acid, and, if desired, determine by the phosphate method. The filtrate, now free from copper and zinc, is boiled with nitric acid to expel sulphuretted hydrogen, and any free sulphur is filtered off. The filtrate, after adding ammonia and the silver iodide indicator, is ready for titration with potassium cyanide.

ANDREW M. FAIRLIE.

Encampment, Wyoming, June 28, 1904.

ASSAY OF CYANIDE SOLUTIONS.

The Editor:

Sir.—In connection with Mr. Grant D. Miller's article on 'The Assay of Cyanide Solutions' in your issue of June 23, I should like to say that I have used the following method for the past eleven months with an approximately 0.2 per cent cyanide solution on values up to $3, with very satisfactory results.

Ten A. T. of solution are heated until quite hot; ammoniacal copper nitrate is then added until the solution shows a permanent blue color. Sulphuric acid is then carefully added in excess, the solution stirred and immediately filtered. The paper is folded and carbonized in a scorifier; transferred to a crucible, fused and cupelled. The method checks very well with the evaporation with litharge.

MAURICE LINDEMAN.

De Lamar, Nevada, June 29, 1904.

THE PREPARATION OF BROWN IRON ORES.

The Editor:

Sir.—In Mr. Garrison's article, 'The Preparation of Brown Hematite Iron Ores,' appearing in your issue of June 16, and in Mr. Johnson's criticism, I am struck with what seems to be a misunderstanding on Mr. Johnson's part. The limonites of the Silurian formation, occurring in the residual clays of magnesian limestones, from my experience, behave, in washing, pretty much as Mr. Garrison says. I take it Mr. Johnson refers to the Devonian strata, which are veined with well defined walls, but of very variable thickness. In washing the run of mine ore, when it is not hand-sorted in the cuts or at the chutes underground beforehand, it yields between 6 to 10 and 7.5 to 10, clean ore to run of mine, whereas the run of mine material in the former case seldom runs as high as 1 to 8 and more commonly 1 to 12: in one case the refuse is mainly of a tough, ferruginous clay, silica, pebbles, drift, etc.; in the other, coarse-grained sand from the hanging wall and small pieces of chert from the footwall, with occasionally drifted mud and pebbles carried in by water through surface cracks.

If, as Mr. Johnson states, his run of mine yields 5 to 8, which seems all right, then his waste is hardly three-eighths of his clean ore, but rather three-eighths of his output of run of mine material. CHARLES H. THOMPSON.

Windrock, Tenn., June 27, 1904.

THE MONTEZUMA DISTRICT, NEVADA.

The Editor:

Sir.—In Mr. Spurr's interesting article on the Silver Peak region, in Esmeralda county, Nevada, published in your issue of May 12, he might well have included the old Montezuma mining district, which is interesting as lying at the surface contact of the ancient limestones of Silver Peak with the late rhyolites of the Goldfield region.

The old camp of Montezuma is situated about 15 miles east-southeast by the road from Silver Peak; while Goldfield is exactly six miles due east. It is also about nine miles southeast of the Paymaster mine, and 20 miles south of the mines on Lone mountain referred to by Mr. Spurr.

The basal rocks of the district are blue coralline limestones, either Cambrian or Silurian, overlaid by a considerable thickness of continuous thin beds of quartzite. The shales crop chiefly in the higher central portions of the range, at altitudes varying from 7,000 to 7,500 ft. above sea-level, and are themselves capped on the east by rhyolitic tufas, the peaks of which rise to a height of from 8,000 to 8,500 ft. with gentle slopes. The rhyolite outbreak appears to have followed a general north and south line of fissuring, as the limestones again outcrop in the valleys to the east, being there capped by rocks, apparently andesitic.

About halfway between Montezuma and Goldfield, a strong north and south fault cuts off the sedimentary rocks, those to the eastward being very largely volcanic tuffs, capped by nearly horizontal beds of quartz porphyry, having a nearly homogeneous paste, with smoky quartz crystals. Where the road crosses the fault, the rocks on the eastern side are much broken, those in the immediate line of movement having been extensively silicified, sheeted vertically, and stained a brilliant red, almost the color of minium. Beyond this fault to the eastward the road follows the bed of a narrow, shallow gulch, the north wall of which shows thin beds of flinty ivory-white quartz, breaking with a conchoidal fracture, with a gentle dip to the east; these are evidently the remains of an extensive flow from hot springs. Thin flakes of this white flint, as well as of obsidian, are scattered all over the district, along the trails used by the Indians, in their annual visits to collect pine-nuts, especially in shale areas, where the shales have crumbled and made a soil of sufficient depth to support a fair growth of piñon and juniper.

While no thermal springs are to-day in existence, the entire rhyolite outcrop shows abundant remains of former activity. Much of the tufa has assumed a pisolitic structure, and large masses consist almost entirely of little hollow spheres of chalcedony, the central core having been removed after their formation, either wholly or in part. Near the actual line of contact with the shales, bosses of the latter stand above the surface, made up of shale breccia, cemented together and full of irregular cavities; and a study of the vein phenomena shows everywhere strong hydro-thermal activity, with a tendency to dolomitization of the limestones on important fracture lines.

There are a few outcrops of rocks of the basaltic series, which appear in the shale area, but their relationship has not been worked out. None were observed in the rhyolite or limestone exposures, so they are probably older than the former. The coloring of the rocks is characteristic; the limestones are bluish gray,

not yellowish brown as at Silver Peak; the shales, greenish olive-brown; and the rhyolites, every shade of red, from pink to scarlet. The granitic intrusions, so characteristic of Silver Peak and Lone mountain, appear to be entirely absent; and as might be inferred, the ores, found almost if not entirely in the limestones, are essentially silver-lead. The latter metal, in the surface ores, occurs, largely as carbonate, associated with more or less copper glance and some chloro-bromides of silver. Galena is probably predominant in depth. Manganese is a constant associate, while the amount of gold present is unimportant.

All workable ore bodies have so far been found in the limestones, and appear to be governed in their strike by the faulting to which the district has been subjected along approximately north-south and southwest-northeast lines, with probably a third series nearly at right angles to the last. These fracture planes are either vertical or approach that position, but do not carry ore in the shales. The only ore-bearing quartz deposits in the shales are limited in length and lie in the bedding of the shales which have been tilted at a low angle to the southeast. These outcrops occur chiefly near the rhyolites, and show only slight mineralization with a low gold tenor and no lead. The brittle fissile shales have been unfavorable to the formation of stable crevices, but the thermal agencies appear to have expended their energy along the lines of fissuring in the limestones, by impregnating the overlying shales, near the contact, with lime carbonates, and converting them into dirty yellowish white calcareous shales, with calcspar, and mammillary coatings in the large interspaces. In only a few of the old workings is there any evidence of intrusive dikes being associated with the ores, but as this evidence consists of rock fragments on the old dumps, the relationship is obscure.

As might be expected from the foregoing resumé, the ore-bodies, while numerous, are of the non-persistent type in length, though the district in the last 35 years has produced, according to hearsay, some $500,000 in ores which have averaged over $100 per ton. The last work of consequence was done in 1887, and at the present time the available surface ore-bodies are entirely or nearly exhausted in most cases, and the search for others in depth is handicapped by the lack of water, and by a country which, from its low relief, does not lend itself readily to deep tunneling.

R. H. STRETCH.

West Seattle, Wash., June 20, 1904.

WORDS AND THEIR WAYS.

The Editor:

Sir.—Recent letters and editorials in your columns have scored strong points in the cause of a reformed vocabulary. This suggestion is offered for what it may be worth: Let some eminent and interested engineer, like the editor of the JOURNAL, lay the question before the next meeting of the American Institute and obtain the appointment of a committee of scholarly men to study the question and submit a report. It would be a tentative list of definitions of technical terms. This report, published in the *Transactions*, would be apt to cause wider discussion than if it were to appear in the columns of a technical paper. The technical press of the United States, England and the Colonies could be requested to publish the bulletin and invite discussion from their readers, while giving it editoral space.

It wll take time. The meanings of words do not crystallize in a day. In due time, by compromise and substitution, a list acceptable to the great majority of technical writers should result. When this substantial agreement is obtained let the publishers of standard dictionaries be approached and induced to embody these definitions in the new editions of their works.

Then will the defenders of the cause be equipped to deal with the heretic according to his deserts. FRANKLIN W. SMITH.

Bisbee, Ariz., June 30, 1904.

[Something of the sort might well be done. Among pamphlets recently issued by the Institute is one embodying the 'Report of a Committee to Co-operate in Standardizing Abbreviations, Symbols, Punctuation, etc., in Technical Papers.' Dr. Raymond, as secretary of the Institute, is as desirous as any one to be a reformer in the cause of technical terminology, but the *Transactions* are already so bulky that a voluminous discussion of the matter would be embarrassing to our friends at 99 John street.—EDITOR.]

AMERICAN GOLD MINES.*

BY J. H. CURLE.

It is quite a long time since I dealt with the progress of the English-owned American mines, so I shall devote the present article to that part of the world.

First of all, I must call attention to the fact that Stratton's Independence is at last on the point of being worked out, and certain sections of the mine are to be let on tribute. This mine I thought would have been worked out 18 months ago, but, as a matter of fact, the profits for the last year, working on low-grade ore, cannot have been large. It will be interesting to see whether this company, with its considerable cash in hand, can secure a mine, or a share in a mine, elsewhere. I fancy that the whole of the Cripple Creek district has seen its best days, but all the other important mines are owned locally, and their condition need not affect us. Our other important Colorado interests are in Camp Bird and Tomboy. The Camp Bird mine, as at April 30th last, had a net profit in sight (contained in 236,000 tons of ore) of £904,000. From this must be deducted one-quarter; this is the share which the vendor is entitled to, and which he will now begin to receive. But to the reduced sum must be added (1) cash in hand of nearly £100,000; (2) the dividend of 1s. payable shortly, which is the final payment for the year ending April 30. Altogether the Camp Bird shareholders can reckon on just about £1 a share profit in sight, after writing off the vendor's interest. On this basis, and assuming that the profit in sight must represent at least two-thirds of the market value, the shares are intrinsically worth about 30s. This price, of course, assumes that the mine will continue to develop as well in the future as it has done up to the present.

The Tomboy is a mine which will have taken a long time to get its head above water, but I firmly believe it has a big future before it. For many months a strike has been raging in the locality, and it has been a great strain to keep the mine on a producing basis; but it looks now as if the mine will come out a winner in the struggle. There is lots of work ahead for the company, as a far bigger mill must be erected, and I expect the capital will be increased to provide for this. The Tomboy is a mine of great magnitude—low-grade, certainly, but with very big ore reserves—and it will pay well some day. I believe in Tomboy.

The Alaska Treadwell and the smaller mines on Douglas Island are going on as usual. On the mainland of Alaska at many different places there is now prospecting and developing of mines, and I look for an increasing yield of gold from that section of the United States. Mexico is doing great things in the mining world. I only wish there were a few more gold mines there, for the conditions are as favorable as in any country in the world. El Oro field, however, is becoming increasingly important. In September, or thereabouts, El Oro will start its 200 stamps; the Esperanza has 120, and the Dos Estrellas is now erecting a substantial plant. The Mexico Mine and the Victoria y Anexas, are also reaching the producing stage.

El Oro, it will be remembered, has about 1,000,000 tons of ore-reserves, and soon, with 200 stamps and with a plant for grinding and re-treating its residues will be earning a minimum of £220,000 a year profit. The bottom level of El Oro, at 786 ft., is still poor, but that has long ago been reflected in the fall of the shares from their previous price of 30s. It must be remembered that in the adjoining Esperanza a new shoot of good ore is showing at a depth almost equivalent to this lowest level, and there is quite reasonable hope that this shoot will spread out and come into El Oro. The other point to remember about El Oro is its chances of getting good ore in the Descubridora vein, or on the extension of the Victoria, or the cutting of a fresh vein in cross-cutting the Somera claim. All of these are possible. El Oro's interest in the Mexico must also be borne in mind, and its valuable railway. Taking all things into consideration, I think El Oro shares are quite good value for the money, and they will go up.

Esperanza, adjoining El Oro, was floated last autumn for £455,000. It was then a producing mine, with 120 stamps, and had ore reserves, with a net profit equal to three-quarters of the capital. For the first six months a profit of over £30,000 was earned. For the current six months the profit should be over £40,000, which is about the figure I estimated on when last at the mine. The ore in the lowest level of Esperanza (not the shoot near El Oro boundary, but another in the center of the property) is 60 ft. thick, and looks as if it would hold for some depth yet. This mine, like all these other American mines, is ably managed, and at the present price of 21s., the shares, to my mind, are well under their true value. The most recently floated of the American mines is the Dolores, in Chihuahua, Mexico. This is only half a gold mine, as the value of silver in the ore is nearly equal to the gold; but it is a very rich little mine, and, if the shoot holds down for 100 ft. more, will return its capital with interest. It is well managed. It has ore reserves representing a big proportion of the issued capital.

*From the London *Economist*, June 18, 1904.

Vesicular means containing vesicles, that is, cells or cavities. It comes from the Latin *vesicula*, the diminutive of *vesica*, bladder. In volcanic rocks this structure is caused by the original presence of superheated steam which distends the viscous or semi-fluid lava. The vesicles are often occupied by zeolites.

BUTTE COPPER VEINS.

BY HORACE V. WINCHELL.

The essential features of a series or group of ore deposits can frequently be shown in a single cross section. Facts which would require a volume to explain and thoroughly discuss in all their bearings may be appreciated at a glance if assembled in such a section. For the purpose of thus graphically illustrating the main points of structure, mineralization and associated rocks of the copper veins of Butte, the section herewith presented was prepared under the writer's direction, and is now in the Montana Mines and Mineral Exhibit at St. Louis. The section is some seven feet long and about half as wide, and is done in oil paints upon artist's canvas. The mono-colored photographic reproduction cannot, in the nature of things, convey exactly the same idea as the parti-colored original. Nevertheless it does serve to represent many of the typical features of the copper veins of Butte and will perhaps interest students of vein structure.

Briefly stated, the facts shown in this section may be summarized and somewhat elaborated as follows:

Country Rock.—The rock enclosing the veins and the country rock of all that portion of the camp in which the veins are mainly cupriferous is commonly called granite, but is more technically quartz monzonite or diorite.[1]

The average analysis of the Butte granite is given by the same authority as follows:[2]

SiO_2	64.03
Al_2O_3	15.58
Fe_2O_3	1.96
FeO	2.83
CaO	4.20
MgO	2.15
K_2O } Na_2O }	6.87

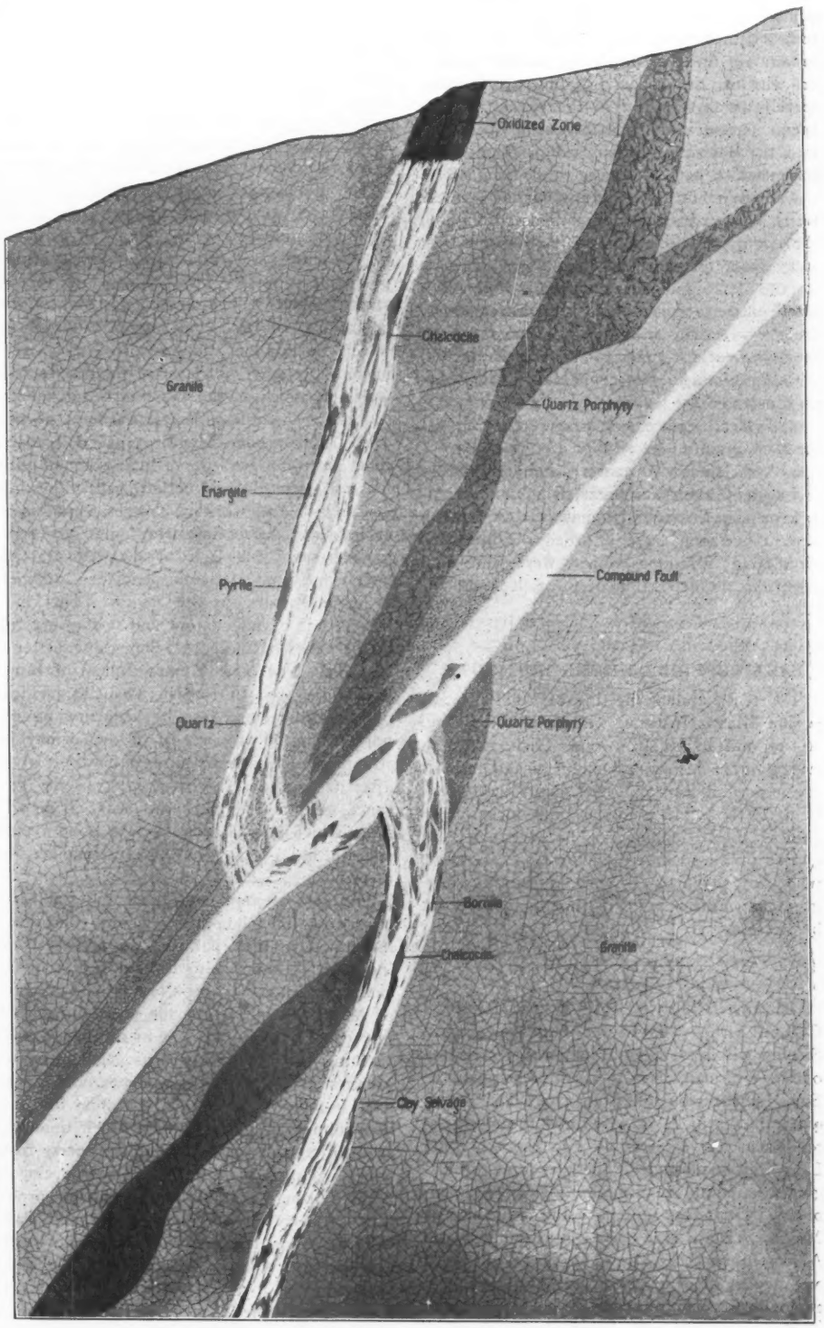
This rock occurs in an intrusive batholith of post-Carboniferous and possibly post-Cretaceous age overlain by Neocene sediments. It is much jointed and sheeted and is penetrated by segregated masses and dikes of aplite and by dikes of quartz porphyry. The latter rock, as indicated on the section, has generally a constant relation to the copper veins. No quartz porphyry dikes are found in that portion of the Butte camp which is exclusively a silver-gold producer; and few, if any, typical silver veins with their rhodonite gangue are found in the vicinity of the quartz porphyry. There is thus suggested a genetic connection between the quartz porphyry and the copper ores.

Structure.—The veins are more or less banded bodies of wholly or partially recomposed country. They are later than and cut through the quartz porphyry dikes, although at the same time generally parallel with these dikes in strike and dip. Both veins and dikes are faulted by innumerable strike and cross faults of several different periods. These faults are compound shear zones and are usually normal, although reverse faults are not uncommon. In the vicinity of the fracturing of the large quartz veins the country rock is often much crushed and somewhat mineralized. Indeed, this rock, both granite and porphyry, often carries merchantable values, although resembling anything but ore. The drag masses included within the larger faults are sometimes of unusual size, attaining dimensions of several hundred feet, and are frequently much enriched by secondary copper minerals.

The faulting movement has continued until very recent times and is perhaps still in progress. Clay gouges are abundant on the walls and in cracks in the quartz, and the latter, as well as the country, where hard enough, is much slickensided.

Vein Minerals.—Quartz is, of course, the most abundant of the vein minerals. The other minerals of the granite have been dissolved and largely removed; but the quartz represents residual silica, recrystallized and rearranged. In fact, there is somewhat less silica in the veins than was formerly contained in the same amount of granite, and there seems to have been an actual abstraction of silica, which has probably been carried downward and again deposited at no very great depths.

The other vein minerals are pyrite, chalcocite, enargite and bornite in decreasing order of abundance. There are also in some mines small quantities of covellite and chalcopyrite, but they are curiosities rather than customary ore minerals.



TYPE OF VEIN STRUCTURE IN THE BUTTE DISTRICT.

All of these ores may, and do, occur at any level of the mines. Enargite is found from the bottom of the oxidized zone to the lower levels, but is plainly increasing in proportion to chalcocite as depth is gained. The principal ore mineral is chalcocite, and it is found at all levels below the oxidized zone, which itself varies from twenty to two hundred feet in

[1] W. H. Weed, 'Granite Rocks of Butte, Montana, and Vicinity.' *Journal of Geology*, vii, 737, 1899.

[2] *Loc. cit.*, p. 741.

thickness. This chalcocite is always secondary and is unquestionably the product of chemical reaction between descending sulphate solutions and unaltered sulphides below.[2] It occurs in films, grains, stringers and even massive deposits many feet in vertical and longitudinal extent and thickness.

Chalcopyrite and chalcocite are often secondary upon enargite, but from this it is not to be assumed that the latter is necessarily the primary copper mineral. Indeed, it is uncertain whether there was any separate copper mineral in the rocks or veins as first formed or whether the copper content was present merely as an impurity in the pyrite and has been concentrated by subsequent operations into the enormously rich and productive deposits which have made the camp famous.

The pyrite is by no means confined to the veins, but occurs in small crystals throughout the country rock for many hundreds of feet away from the veins. Its first appearance is in the ferro-manganese minerals, which it often entirely replaces. It is both very early and very recent, and seems to have formed from the earliest times to the present day.

Recapitulating: The copper veins of Butte, as illustrated by the ideal section, are:

1. Typical replacement veins occupying fissures in granite.
2. Associated with quartz porphyry dikes.
3. Cut by numerous faults, which, continually kept open through great intervals of time by slow movement, have afforded channels for circulating solutions which were the final agents in the deposition of the rich secondary ores.

LAKE SUPERIOR MINING INSTITUTE.

The tenth annual meeting of the Lake Superior Mining Institute will be held on Aug. 16, 17 and 18, at Ironwood, Mich., with an excursion to Milwaukee and Chicago to visit the important iron and steel plants there, particularly the South works and ore docks of the Illinois Steel Company. The meeting is in charge of the members on the Gogebic range, who are planning a very interesting programme. Particulars will shortly be sent out by Secretary A. J. Yungbluth.

GEOLOGICAL SURVEY WORK IN COLORADO.—The United States Geological Survey will have a party under the direction of Dr. Whitman Cross to continue mapping the San Juan region of Colorado. The Ouray quadrangle will be surveyed and the work extended as far as possible into the adjoining Lake City quadrangle. The survey of the Engineer mountain quadrangle will also be completed. Dr. Cross will have the assistance of Messrs. Ernest Howe, W. H. Emmons, and Albert Johannsen. Mr. J. E. Spurr will begin an investigation of the areal and economic geology of certain mining districts in Colorado, chiefly in Gilpin and Clear Creek counties. Mr. Spurr will be assisted by Messrs. Sydney H. Ball, George H. Garrey, and Oscar H. Hershey. Mr. S. F. Emmons will complete his monograph on the geology of the Leadville mining district, and Dr. J. D. Irving will make an investigation of the ore deposits of the Ouray district.

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[2]H. V. Winchell, 'The Synthesis of Chalcocite,' etc. *Bulletin Geological Society of America*, 14, p. 269. ENGINEERING AND MINING JOURNAL, vol. 75, p. 782.

A WORKING MINE AS AN ADJUNCT TO THE MINING SCHOOL.

BY CHARLES R. KEYES.

The growth of the idea that graduated students in mining engineering should have some practical experience before being permitted to supervise mining work has been variously met by the mining schools.

It has been the custom of some of the mining schools of the Atlantic States to send the students of the graduating class in the summer vacation, under the charge of the instructor, on an excursion through prominent mining districts. The main object of such a tour is, of course, to give the students some practical insight into mining operations, and to bring them into contact with their future work.

The mining schools of the Rocky Mountain States are situated in a natural environment of mines and ore treating plants in great variety. They are enveloped in a mining atmosphere, as it were. The students are in constant contact with mining men and mining operations of all kinds. The information which the student thus absorbs, most of it unconsciously or at least without effort, is worth as much as the theoretical and laboratory work he does. But even then the students do not have facilities that will enable them to enter into the actual work of mining and to acquire a certain practical familiarity with the working details which is so essential to successful operations. In order to overcome this lack of detailed practical knowledge many students spend their summers in manual work in the mines. This in a measure, is commendatory, but it does not fulfil the needs of the case. Something better is required. The New Mexico School of Mines has endeavored to furnish adequate facilities of the kind referred to by acquiring an important mining property of its own where instruction in practical mining may be given after its own ideas. This property is the Torrance gold and silver mine near Socorro, a mine which has already made a good record and still has a long way to go to complete that record.

The first attempt ever made to establish a practical mining laboratory in any educational institution by incorporating an actual working mine is believed to be that begun in the summer of 1902 by the New Mexico School of Mines. At that time the possibilities were first considered for the use of the Rio Grande smelting works at Socorro as a laboratory of practical metallurgy. As a companion experiment in mining education a laboratory for practical mining was considered. Much time was spent in trying to find a suitable property from which a model mine could be developed. After thorough examination a small but promising property was finally acquired and plans were made for developing it. Soon afterwards a larger and more attractive mine was found to be on the market, and only a short distance from the college campus. Mainly through the generosity of one of Socorro's prominent citizens this property, the Torrance mine, with all its appointments, has come into absolute possession of the school. Included in the transaction is a bond and lease for a period of years on five adjoining properties.

The Torrance gold and silver mine has long been known as one of the most famous in the Southwest. It has a remarkable record. Already it has produced nearly $1,000,000. This mine presents one of the finest examples of timbering in New Mexico; the main opening is through a double compartment incline; there are five levels. Important ore-bodies are opened up. Great variety in mining methods is shown. There are fine stopes, and on the fifth level there is a shaft. The geological structures associated with ore deposits are seldom so well displayed. The problems presented are many. Variations innumerable are found in contiguous properties. The hoisting house is substantially constructed, and the ore-bins are capacious and well built.

Exceptional opportunities are thus offered for students to carry on actual mining operations. Sinking of shafts, driving levels, constructing winzes, advancing development work, and stoping are included. Timbering in its various phases is undertaken. Complete surveys are made and maps drawn. The mine is thoroughly sampled and the samples assayed. The geological conditions are carefully studied both underground and on the surface. There is practice in reporting on mining properties and the valuation of the ore-bodies. Plans and specifications are drawn up for all appurtenances connected with the operation of the mine under varied conditions and in relation with the milling. All other work of an engineering character receives attention.

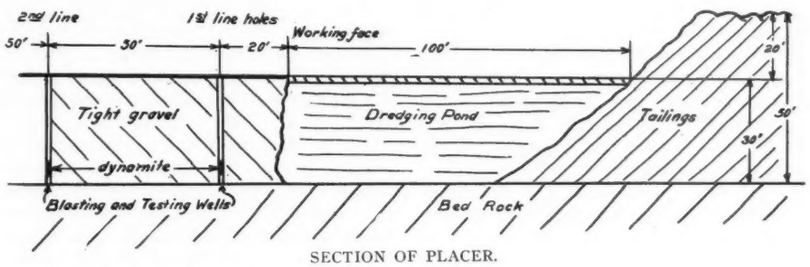
At Silchester, near Reading, in England, a gimlet screw was found exactly like the screw from which Nettleford and Chamberlain made a fortune. Silchester was deserted about the fourth century.

DETERIORATION OF HOISTING ROPES.—In a discussion of the breaking of a hoisting rope at the Aldworke colliery by which seven men were killed, the *Colliery Guardian* calls attention to the facts developed by an investigation. The rope had been inspected the day before, and about half an hour before the accident had been tested by hoisting loaded cars twice up and down the shaft. The rope showed no sign of internal corrosion at the point of fracture, the separate strands being well protected by a tarry coating. The actual breaking strain of the rope was found to vary from 15.5 to 44 tons (the breaking strain for a new rope should have been 56 tons), and the loaded wagons had weighed 4 tons, whereas the total weight at the point of fracture, due to rope, cage and men, was less than 3.5 tons. The cause of the fracture was not determined, but the rope had evidently, from some cause or other, so deteriorated that, while to all appearances sound, it became liable to fracture under any sudden stress. The late Sir C. Le Neve Foster has pointed out that breakages of hoisting ropes used for raising or lowering men, not due to failure of couplings, amounted in 1902 to 58 cases in the United Kingdom. Probably a large number of such accidents is to be explained by the sudden application of the brake when the cage is falling rapidly. In Belgium where there have been but six cases of broken hoisting ropes in 10 years, the permissible working load is not allowed to exceed one-tenth of the breaking strain of the rope when new, unless the length of 2m. cut off every three months shows that the breaking strain has not been reduced over one-third. Hoisting ropes tend to elongate in use, though made of the best crucible steel; the great variations in strains may set up molecular changes, and these changes are cumulative. Finally a sudden checking of speed may cause fracture.

BLASTING TIGHT PLACERS BEFORE DREDGING.

By OLIVER B. FINN.

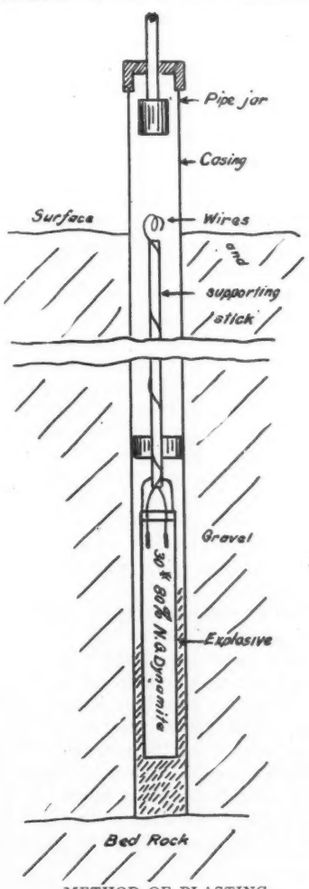
Gold dredging has made such rapid strides of late and there is such a widespread interest in this branch of mining that I venture to contribute a detailed account of the way in which a Keystone driller was used by me in California to loosen, by blasting, a very tight gravel deposit, preparatory to dredging. There is a great difference between "cemented gravel" and "tight gravel." A truly cemented gravel is not a dredging proposition, while the tightest possible gravel, where there is no cement, can be made easy working by the following method of blasting:



SECTION OF PLACER.

The deposit in question was practically a solid mass of cobbles, the voids being filled with a heavy sand, forming a mass so tight that every conceivable method of manipulating the dredge resulted in constant breakages and a failure to dig sufficient gravel to yield a profit. The dredge was of the elevator type, much too light in construction for unblasted tight ground. The results of an eight month's run showed the average load of the buckets to be only one-fourth of their capacity, while much of the time many of them ran empty, and 50 per cent of the working time was lost in shutdowns for repairs, thus reducing the work done by the dredge to one-eighth of its capacity. The repairs had cost thousands of dollars, and although the ground contained good dredging values, the undertaking was a total failure, until finally blasting was adopted. It was proposed to blast this ground, using a 6-in. churn drill to sink wells (in the bank ahead of the dredge) in which to place the explosives. As the procedure was entirely new, a number of months were wasted before the owners of the dredge would supply a drill, but being prevailed upon to do so, upon arrival of it, a line of holes was driven to bedrock about 20 ft. back from the working face; the holes 50 ft. apart, and each succeeding line of them 50 ft. farther back. The holes in each line 'staggered' with those of the next. Each hole was blasted as soon as completed. Black powder was found useless, since, owing to the tightness of the ground, the whole force of the explosion was spent in blowing out the tamping and water. Various sizes and strengths of explosives resulted in the selection of 30 lb. of 80 per cent nitro-glycerine dynamite. This was put up to order at the factory in tin cans 3 ft. long and 4.5 in. in diameter, with a wire bale fastened to the inside of the can so as to make a smooth cartridge readily inserted into the well through the inside of the casing. Before inserting the explosives, the well casing was drawn up about 4 ft. from bedrock; the casing could not be entirely drawn before loading the hole, as the hole would be partially filled by caving in from the sides. Electric exploders were used, two to each charge; the second one as a precaution against a missed shot.

As the 'pipe jar,' which is the best device for pulling up the casing, practically closed the top of the casing, the electric wires had to be kept within reach during the drawing of the balance of the casing by fastening them to a stick 1 in. square, which reached from the cartridge bale to the surface of the ground when the cartridge was in place, care being taken to have sufficient casing above ground to prevent the 'pipe jar' from striking the upper end of the stick. The stick also served the purpose of supporting the charge, when lowering it into the well and preventing any strain upon the electric wires. When the charge had been carefully lowered into place, the 'pipe jar' was replaced and all casing withdrawn. The hole was then filled with sand and the drill moved to the place for the next hole. The wires were connected with the dynamo upon the dredge, and the charge exploded.



METHOD OF BLASTING.

The explosion did not displace any of the bank, but the shock and vibration was such as to loosen the cobbles without disturbing their original relative position, excepting, of course, those close to the shot. Each explosion was effective far beyond its allotted area, so that the spacing of the holes could be gradually increased to as much as 100 ft. apart.

By saving the gold from the drillings of each hole, this method served the double purpose of blasting and testing.

This preparation of the ground resulted in the buckets running full to overflowing continuously, and there was no occasion for shutdowns, except for clean-up of gold and oiling the machinery; notwithstanding, the machine was practically a wreck from previous hard usage. In other words, the capacity or output was increased eightfold, and the expense for repairs reduced to that of normal wear and tear. In this way many total failures could be turned into successes, and the necessity avoided of either giving up the entire project or supplanting a dredge otherwise too light for the work with a heavier and more expensive one.

The average cost of the blasting was not over 0.5c. per cubic yard. Where ground is at all tight and the buckets do not easily fill. I would advocate blasting of ground, even for the most powerful machine that could be built; since it is evident that a very small outlay in this direction would be saved many times over in power expended on the bucket line and in lengthening the life of all wearing parts, to say nothing of the increased capacity of the dredge.

COAL PRODUCTION OF BOSNIA.—The coal produced in Bosnia is all brown coal, or lignite. The quantity mined in 1903 was 467,962 metric tons, against 424,754 tons in 1902; an increase of 43,208 tons, or 10.2 per cent.

COAL IN THE SAHARA.—According to the *Zeitschrift für praktische Geologie* (April, 1904), recent exploration of the Carboniferous formation in the Southern Atlas region has resulted in the discovery of a coal-bearing series containing two coal-seams. The locality is between the Erg of Issauan and the plateaus of Egele and Igidi, the Carboniferous being a part of the same formation which extends from the Tuareg country into the Sahara of Morocco. The rocks are chiefly limestones, clays and marls.

NEW JERSEY IRON MINES.—The production of iron ore by mines in New Jersey during 1903 amounted to 289,323 tons, as compared with 443,728 tons in 1903. In the last annual report of the State Geologist, attention is called to the apparent decline of the iron industry in recent years, but the view is expressed that it has been due rather to the unsatisfactory way in which mining is now being conducted than to exhaustion of the resources. At the present time the mining industry is in process of transformation. During the several decades that the mines have been in operation they have reached considerable depths, and the difficulties surrounding their exploitation have been increased. With the introduction of concentrated power plants, straight shafts, magnetic separators and other permanent improvements iron mining will experience a revival, and there is still bright promise for the industry.

PYRITE SMELTING. A REVIEW.—VI.

By EDWARD D. PETERS.

Several of the contributors to the recent discussion state that an iron matte, free of copper, forms a satisfactory collector of the precious metals under suitable conditions. Others, evidently, have not found this to be the case; but positive evidence is better than negative, and in the light of such unimpeachable statements as we now have on the subject, we may, I think, accept as a fact that, under favorable conditions, a matte free from copper will collect the precious metals satisfactorily.

The question at once arises: What are these favorable conditions? As has been already stated, a rather silicious, liquid slag of low specific gravity is highly advantageous, for, without this, the light iron matte will find it difficult to settle properly.

There are, however, other factors that profoundly influence the collection of the precious metals in an iron matte; and, in order that this most interesting point may not be left incomplete, I shall take the liberty of discussing briefly some of the other conditions that bear upon it.

In the first place, this question, though most important to the pyrite smelter, does not belong any more to him than it does to the ordinary smelter of roasted ore. For many generations past, therefore, whenever the copper metallurgist has been smelting sulphide ores containing gold or silver, whether in blast furnaces or reverberatories, and whether raw or roasted, he has been accumulating facts that bear directly upon this question. It would seem, therefore, that by this time we ought to possess enough information on the subject to enable us to say positively that, when making a slag of such and such a composition, and with a charge of such richness in gold and silver, our matte must contain so and so much copper in order to be an efficient collector of the precious metals present. As a matter of fact, we can do nothing of the kind; and, in smelting two different ores, having the same values in precious metals and yielding a slag of identical composition, we may easily find that, in the one case, a matte entirely free from copper will prove an efficient collector of values, while in the other the matte must contain several per cent of copper in order to clean the slags effectually.

With the object of inviting discussion, I will suggest the following factors as having a bearing upon the collection of the gold and silver in an iron matte.

1. The physical make-up of the ore.
2. The influence of certain substances that often accompany the precious metals in very minute quantities.
3. The formation during the operation of smelting, of certain substances that may act as collectors.

1. *The physical make-up of the ore* is probably the least important of the three factors just enumerated, but must, I think, be recognized in certain ores. It is impossible to discuss the point properly except at length, but I have several times convinced myself that, in certain cases where free gold or tellurides exist in minute specks throughout massive quartz, and the amount of matte made is small and is produced from coarse iron sulphides that are not disseminated throughout the same ore, the slag may run high, owing to want of juxtaposition between the collector and the particles of gold.

2. *The influence of certain substances that often accompany the precious metals in very minute quantities.* The attention of many matte smelters was first directed to this point by Richard Pearce's experiments and deductions in his paper entitled 'The Association of Gold with Other Metals in the West."[1] I know that this paper cleared up for me many obscure and apparently conflicting results encountered in the matte smelting of certain gold and silver ores, at times when my precarious supply of copper ores ran short. Mr. Pearce shows, by actual experiment, that: "Pure gold melted with pure iron pyrite is not attacked in any way by the fused sulphide of iron. A matte is obtained in which the gold exists in a pure state, but disseminated through the mass in very fine globules."

Mr. E. G. Spilsbury[2] described the smelting of a mixture of raw and roasted pure iron pyrite concentrates, carrying about two ounces in gold per ton. The properly fluxed ore was smelted by Professor F. W. Clark, of the Massachusetts Institute of Technology, in a small reverberatory furnace. The well-melted slag contained from 1 to 1.6 oz. gold per ton, and the resulting iron matte assayed 4 to 8 oz. per ton, the gold values being very irregularly distributed in the matte, though the slag assays were comparatively uniform.

These experiments, in connection with results obtained in my own practice, lead me to believe that *pure* iron sulphide is a very poor collector of *pure* gold (or of gold containing very little silver), and this belief is held, I think, by most metallurgists whose attention has been called to the matter. It appears that, in such cases, the gold is simply held in mechanical suspension in the matte, and not in *solution*, as Pearce expresses it. The same observer found further, that the presence of minute proportions of bismuth (which occurs much more frequently in connection with gold ores than any one realizes, except, perhaps, the electrolytic refiner), and perhaps, also, tellurium, caused a complete solution of the gold in the iron matte; and it is quite probable that arsenide and antimonide compounds may exert a similar influence.

It seems to me probable, therefore, that, in cases where a good collection of the precious metals has been made by an iron matte free from copper, there have been present small quantities of bismuth, tellurium, arsenic, antimony, or other substances that have aided this collection, and that we need a good deal of accurate and delicate chemical investigation on this subject before we shall be able to predict, in any given case, whether we are going to be able to make clean slags without any copper in the matte.[3]

3. *The formation during the smelting process of certain substances that act as collectors.* That metallic iron, under certain conditions, will act as a collector of gold, though not of silver, has long been known to metallurgists. More than 50 years ago a blast furnace was erected for the purpose of smelting into metallic iron the rich gold-bearing black sands of the Siberian placer mines. It is said to have yielded clean slags, and a pig-iron rich in gold. It was eventually given up, owing to the expense of separating the gold from the pig-iron, and the difficulty of controlling the reduction of the iron oxides in the furnace.

The originator of the process hoped to be able to slag a large proportion of the oxidized iron as ferrous oxide, and to reduce just sufficient of it to obtain a moderate amount of metallic iron rich in gold. This he was unable to do with any certainty, as, if he reduced enough of the oxides to metallic iron to obtain clean slags, he found that, before he could stop it, nearly all of the oxidized iron in the charge would be reduced to the metallic state, thus producing a large amount of low-grade metal and robbing his slag of its needed flux.

This experience is useful to us as showing that metallic iron has, at least, some power in collecting gold; but, apart from this, it is of little interest to the matte smelter, as the conditions are completely changed by the presence of sulphides in the charge.

For the true pyrite smelter, it has an even more remote bearing; for not only may the presence of sulphides in the furnace obscure the reactions, but the metallic iron that he, under certain conditions, produces is a totally different substance from the metallic iron produced in smelting the Siberian black sand with coke. The cause of this difference is obvious. In the coke furnace, as run on these Siberian black sands, the product was simply cast-iron, and the reduction was effected by the carbon, and the resulting iron contained carbon, as does ordinary pig-iron. In the pyritic furnace, the atmosphere averages distinctly oxidizing; else the sulphur would not be burned, nor the iron be changed into ferrous oxide, nor would it be 'pyrite smelting,' as I am employing this term.

Consequently, the metallic iron, which is occasionally produced in considerable quantities in the pyritic furnace, would appear to be produced under distinctly oxidizing conditions and not to be connected with the presence of carbon. I know positively that metallic iron can be made by blowing a powerful blast into molten sulphide ores, when making a very silicious slag, because I once inadvertently filled up my hearth with an iron sow, when trying to smelt raw sulphide fines *without carbonaceous fuel* The fines ran down through my coarser silicious ore, the result being that the charge soon froze solid, but not until a sow of metallic iron, weighing several hundred pounds, had been formed.

Dr. Carpenter gives much valuable information on this matter in his paper on 'Pyritic Smelting in the Black Hills,"[4] Messrs. Fulton and Knutzen supplement this by a more recent paper.[5]

I quote from the latter: "The matte formed rarely contains more than 30 per cent sulphur, while the iron monosulphide contains 36.36 per cent, so that the matte is evidently a subsulphide. It also contains metallic iron, which can be readily abstracted by the magnet. We agree with Dr. Carpenter that it is this metallic iron in the matte which collects the gold, but unfortunately, it is rarely present in the matte in sufficient quantity to give clean slags. Paradoxical as it may seem, the quantity of metallic iron formed in the furnace is due to a large extent to the amount of oxidation which takes place in the furnace. . . . In our opinion, the production of sows is practically inseparа-

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[1] *Transactions* American Institute Mining Engineers. Vol. XVIII, page 447.

[2] *Ibid.* Vol. XV, page 767.

[3] Since the completion of this article, I have received a copy of a paper by Mr. Myrick N. Bolles, B. S., to appear in the *Transactions* A. I. M. E. for 1904, entitled, 'The Concentration of Gold and Silver in Iron Bottoms,' this contains much valuable original work on the matter discussed under this head.—E. D. P.

[4] *Transactions*, A. I. M. E., Vol. XXX.

[5] *Ibid.* 'Sulphide Smelting at the National Smelting of the Horseshoe Mining Company.' 1904.

ble from sulphide-smelting when high concentration is done. The sows are due to the strong oxidizing effect of the furnace, as shown from the following data: A desulphurization of 80 per cent; the production of copper sulphate, found in layers in the accretions of the downtake; no evidence of carbon monoxide in the furnace gases; the volatilization of all the lead fed into the furnace; and the facts that, while no iron goes into the furnace as oxide, the slag contains from 18 to 20 per cent of iron oxide in the form of silicate. These data make it difficult to imagine that the reducing conditions in the furnace could exist sufficiently strong to produce metallic iron.

We believe that the sows are produced by oxidation in a similar way that metallic copper is produced during bessemerizing; taking as the first stage the melting of the pyrite, FeS_2, and the loss of the one atom of sulphur, thus forming the monosulphide, FeS; the second stage, the gradual oxidation of the sulphur in the monosulphide, producing a subsulphide; the third stage, the production of some ferrous oxide, part entering the slag and part reacting with the subsulphide present, producing sulphur dioxide gas and metallic iron, according to the following chemical equation:

$$FeS+2FeO=3Fe+SO_2$$

Experience has shown that a larger quantity and higher pressure of blast result in an increased production of metallic-iron sow, and, from its analysis, it is seen that it contains practically no carbon."

It seems possible, therefore, that the production of a certain proportion of metallic iron in pyritic smelting may carry into a pure iron matte gold values that would otherwise not be saved.

PRODUCTION OF COAL IN RUSSIA.—The production of coal in the Donetz basin for 1903 was 12,386,289 long tons, as compared with 11,140,321 tons in 1902. About 12 per cent of the total for each year was anthracite coal, mostly mined in the Don Cossack territory. According to the report of the British Consular agent at Mariopol, from which the above information is taken, the proposed output for 1904 is 13,500,000 tons, which is about 1,000,000 tons more than the estimated consumption. The condition of the coal mining industry during 1903 was more satisfactory than for several years past, but it is feared that the surplus of production for 1904 will cause a market depression.

COST OF DIAMOND DRILLING IN ARIZONA.—Drill runners in Bisbee earn up to $4 a day, and setters get more than that. In reference to the comparative costs of drilling and shaft sinking, the experience of the Calumet & Cochise is in point. This company sank a standard three-compound shaft, thoroughly timbered and well equipped, but without any considerable expenditure for pumps, to a depth of 998 ft., through hard silicified lime the entire distance, at a cost of $65 a foot. Of this cost, labor was about $20, timber about $9, powder $8 and other items make up the remainder. The fuel cost was heavy. In one month this shaft was dropped 140 ft., which was a most excellent record, and it was complete in eight months after work started.

RECENT DEVELOPMENTS OF MINING IN CALIFORNIA.

By CHAS. G. YALE.

Many of the older mining towns in California, the center of flourishing districts forty or fifty years ago, are placed on top of beds of gold-bearing gravel still untouched. In some of these localities mining is still carried on, but by methods different from those used in the early days. This is notably the case at Oroville in Butte county, where the dredging industry has become so important in recent years. After the first discovery, the white miners worked over the ground, and then left it to the Chinese. The so-called "lava beds" below the town were burrowed by the Chinese with their accustomed diligence for years; there were times, during seasons blessed with abundant water, when as many as 9,000 of them were at work. The Chinese left finally, and then came the dredge-men, who are working over the same ground in an altogether different way. They turn over everything from top to bottom, while the Chinamen only 'drifted' on the bottom gravel lying at a depth of 30 to 40 ft. The town of Oroville itself lies over a rich gravel channel, which has never been worked. The dredges are now in operation close to the town, and even ground on which there are numerous buildings has been bought for dredging. The citizens are averse to any further encroachments on the town site, and the matter has become a burning question. Experienced dredge-men say that it would not pay to buy town lots at the prices asked and then try to work them; but there are some who think a good thing could be made out of the underlying gravel by moving all the buildings to a higher elevation and then working over the vacated site.

At the town of Dutch Flat, in Placer county, once famous for its large hydraulic operations and heavy beds of gold-bearing gravel, mines are now either worked out, or are being run on a dwindling scale. Recently, however, a local company has been formed to work the untouched gravel lying under the town. The organizers of this company expect to run adits and then exploit the gravel deposit.

Again, at Weaverville, in Trinity county, the center of the famous Weaver basin, from which many millions of gold have been taken in the past fifty years, an examination is about to be made of the old channel underlying the town. Prospecting drills have been started by a company consisting of the business men of the town, and holes are being sunk to determine the exact position of the gold-bearing channel, its extent and probable richness. If the results are satisfactory, shafts will be sunk and the bottom gravel removed by 'drifting.' For miles around this settlement the gravel was very rich and in thick beds. The shallow gravels were first worked by sluicing, and the higher banks were then worked by hydraulicking. Some of the hydraulic mines have been worked continuously for over thirty years, and quite recently important operations have been started by reason of an increased water supply. Even now La Grange, on Oregor mountain, is the largest hydraulic mine in the State. Although this district was noted for that class of mines, very little 'drifting' has been done there, comparatively speaking.

Another feature of recent mining development in California is found in the electric plants and transmission lines, which furnish power to the leading mining districts. Several of these plants have been described in this JOURNAL at different times. Among such enterprises now projected is that at Junction City, a small place a few miles from the town of Weaverville mentioned above. Here the North Mountain Power Company has purchased the water rights of the old Compagnie Francaise, which formerly operated hydraulic mines, and will use the water to generate power. The mines are nearly worked out, and the old company has no further use for its ditches and water supply. The plant is to be installed on the barren bedrock at the old McGillivray claim, where the ditch runs along the mountain side 600 ft. above the point chosen for the power-house. Electricity from this plant will be transmitted as far as Eureka in Humboldt county, and power will be supplied to purchasers all along the Trinity river from Junction City to Eureka, for use in mines, dredges and the like. There is much virgin dredging ground in this region.

At Etna in Siskiyou county, the center of a flourishing mining region, the Siskiyou Electric Power Company is putting a new power-house. This company recently bought out the Etna Development Company, and will use the Fall Creek power-house built by that company, in addition to the new plant which it is building. Transmission lines will supply many mines with power. In Shasta county two new companies are preparing to use the waters of Hat creek by diverting it in flumes to the power-plant which they are about to build. In Plumas and Sierra counties also several companies are arranging to build dams and establish power-plants to supply the mining districts.

These instances are given as examples to show the extensive work which is now being done to utilize the power of the mountain streams within the mining region. There is, of course, in California an especial inducement for such work by reason of the high price of fuel, which is an important factor in the cost of mining and milling in the State.

MINERAL FIBERS FOR PHYSICAL INSTRUMENTS.—The advantages of fibers made from fused quartz for fine suspensions requiring a steady zero point are: small elastic fatigue, great strength, and the possibility of drawing very fine threads. In getting long fibers, whether by drawing from a fused lump of quartz or by building up rods, the fused lump or the built-up rod must be free from air bubbles, and the removal of such bubbles is often a very tedious task. K. E. Guthe in the *Physical Review* for April, 1904, says that after experimenting with a great number of substances, all silicates of magnesium, he found but two, amphibole-asbestos ($Mg_3\ Ca\ Si_4\ O_{12}$) and steatite or soapstone ($Mg_3\ H_2\ Si_4\ O_{12}$) that give clear beads before the oxy-hydrogen blowpipe. These, especially soapstone, under propper manipulation, can be made to give fibres of desired dimensions, and the soapstone fibers have practically the same elastic properties as quartz. Hardened soapstone used under the name of 'lava' as tips for gas burners is easily procurable. It melts to a clear bead in an illuminating gas-oxygen jet having a small, quiet flame. After taking the pearl out of the flame the thread is drawn, its thickness and length depending upon the temperature and on the rapidity of drawing.

NOTES FROM THE LOUISIANA PURCHASE EXPOSITION.

EDITORIAL CORRESPONDENCE.

The St. Louis Exposition, in its general scope and design, is certainly the largest and most comprehensive affair of the kind we have yet seen in this country. It has brought together a collection of exhibits well worth studying in almost every branch of industry, and the time spent in observing the development of production and invention can well be made profitable.

In the Department of Mines and Metallurgy there was a special reason why a full exhibit should be made. A very large part of our best mining territory is in the region added to the United States by the Louisiana Purchase, in commemoration of which the Exposition is held. Not only Missouri, Illinois, Iowa, Minnesota and other important coal and iron producing areas were included, but all the Rocky Mountain States north of New Mexico, as well as Oregon and Washington; in other words, we have in this territory the coal producers of the West, a large part of the iron region of Lake Superior, and all the important producers of precious metals outside of California and Arizona. These States and Territories were, therefore, bound to take especial interest in the Exposition, and to do their best to show their present development and their possibilities for future growth.

This being the case, it is natural that the other States should not allow themselves to be outdone by the commonwealths carved out of the Louisiana Purchase. They also should desire to show what has been accomplished during the century since the addition to our national territory has been made. Nearly all the States have responded to the call of the Exposition managers, and have presented creditable and instructive exhibits; while these have been supplemented by private enterprise in the presentation of machinery, processes and products.

Our attention is, of course, drawn chiefly to the Department of Mines and Metallurgy; though exhibits of interest to mining men are found outside of that department, notably in those of machinery and of electricity. Naturally there are many points where it is difficult to draw the line exactly, and the mining man will find many things of practical interest to him in those departments.

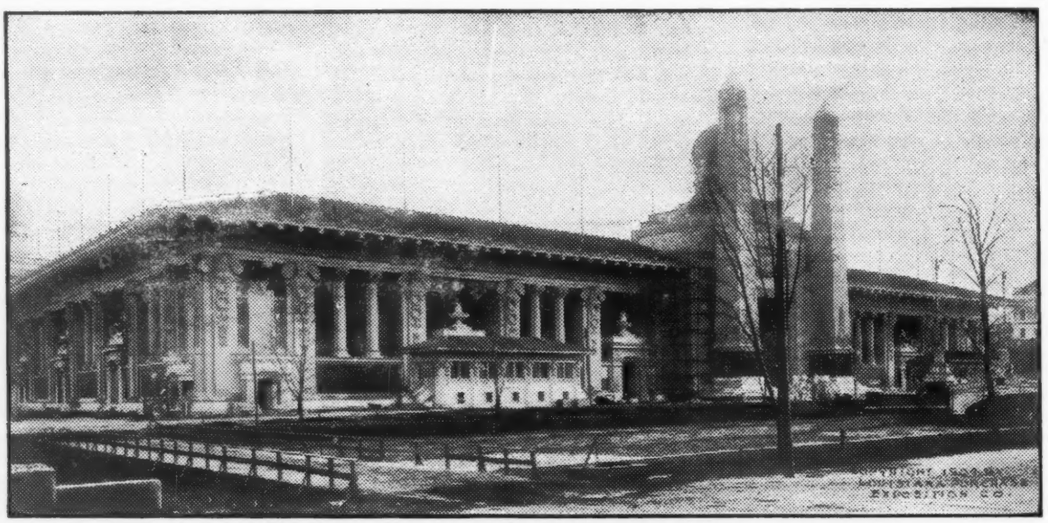
The Mining exhibit is found partly in the Mines Building proper, and partly in a section outside of the building, which has been called the Gulch. In the building are all the State exhibits and a part of the machinery. In The Gulch are found some installations of hoisting machinery, tramways, haulage, well-boring machinery, diamond drills and other machines. These are generally intended to be in operation, the object in placing them in the outside exhibit being to reproduce natural conditions as far as possible.

The exhibits in the Mines Building itself were in very nearly complete order at the opening of the Exposition, and the building is, or was at the time of the writer's visit, in June, in much better condition than almost any other building on the grounds. This was largely due to the exertions of Dr. J. A. Holmes, head of this department of the Exposition. His energy and systematic work compelled order; while his active preliminary canvass induced exhibitors to forward their material promptly and to begin the necessary work in good time. Much credit is due to Dr. Holmes and his staff, and mining men who were on the ground early were gratified by the condition of their special field.

The outside exhibits, in the Gulch, were less advanced, in common with all outside work on the grounds. This was due to a long period of wet and uncertain weather, and to difficulty in obtaining labor of the right sort. The last named trouble, in fact, was a source of much embarrassment and delay all through the Fair. The preliminary work was several times stopped by strikes, and it was impossible to obtain all the labor needed.

In general arrangement the Mines Building is a parallelogram, having four main aisles running in the direction of the greater length, dividing the space into five principal sections. The exact dimensions are 750 ft. in length and 525 ft. in width, giving a floor space of 9.04 acres. The architecture of the outside is impressive. While the treatment has been simple and almost severely plain, many people think that it is the most impressive building in the Exposition, on account of the absence of florid decorations. The general design is shown in the accompanying views. It is difficult, however, to give more than a general idea; and it is impossible to take any good photographs of the inside of the building. The space is so fully occupied that any view would be broken, and would give little idea of the general effect. Most of the exhibitors, fortunately, have been wise enough to avoid the ornamental structures and facades which disfigured the Mines Building at Buffalo. The interior effect, consequently, is light and open, and the visitor is able to take much in at a glance, besides finding, with little difficulty, any special division which he wants to see. An exception to the general rule is found in some of the foreign departments, especially Germany and Japan, which are carefully partitioned off. Being at one end of the building, however, this hardly changes the general effect.

The prevailing arrangement is by States, these exhibits occupying the central portion of the space, while the heavy machinery is ranged around the sides of the building. Many exhibits of machinery, for which room could not be found, are placed in the wide corridors surrounding the building. Up to the present time very little of the machinery is in operation. Only in a few cases, where some arrangement has been made for a special motor, can it be seen actually at work. This is to be regretted, since machinery in actual operation is always more readily understood and more easily explained, while its results are before the observer.



THE MINES BUILDING AT THE ST. LOUIS EXPOSITION.

In one sense the Mining exhibit is rather disappointing. It is good in many ways, but it is not as instructive as it might be. It was hoped that the visitor would be able to see something of actual work, if not of mining, then of ore dressing and treatment processes, and even that some experimental work might be done. Perhaps that was too much to expect under the circumstances. At least it may be said to be far better than the simple display of cases of ore specimens, crystals and gold nuggets, which was made at Buffalo. The Gulch exhibit, when completed, will be a valuable supplement to the Mines Building, and will show more of the actual work of mining than could be done in the building.

The only experimental work which will be done in connection with the Exposition will be a series of tests of the fuel and coking values of coal and the values of coke. These will be carried on outside the main exhibit, under the charge of Mr. E. W. Parker, of the United States Geological Survey. For this purpose some coke-ovens and a small foundry plant are being erected, together with some gas-producers. These tests will include determinations of the fuel value of different coals; their relative value as steam coal, or for other purposes; and their use in the manufacture of coke. The coke tests will be made mainly in the cupola of the foundry. Such a series of tests, if conducted properly, ought to show results of great value.

Upon the whole, it may be said that the coal and iron interests make the best showing in the Exposition. This was to be expected, not only on account of their greater economic importance, but because the coal mines and iron producers are nearer St. Louis, as a rule, and because they admit of presentation better. Besides products, there are a number of working models, sections and the like, which are both instructive and attractive to the public.

There is one very notable point about the iron exhibit, and that is the absence of any representation of the activities of the United States Steel Corporation. The only things bearing its name are a few samples of ore from some of its mines on the Mesabi Iron Range, and the presence of these is due to the State geologist of Minnesota. It seems extraordinary that a company controlling nearly two-thirds of the iron and steel production of the country should refuse to assist in presenting those industries. It would seem that some sort of adequate display was due to the public. No such argument seems to have appealed to the managers, and nothing has been shown here. It is another instance of the narrow policy and narrow views which seem lately to have controlled the company's management. This feature of the Mining exhibit is the subject of frequent and unfavorable comment.

Owing to the arrangement of the exhibits by States, it is difficult to separate the different metals. In the following notes on the State exhibits, however, an attempt is made to cover the metal mining field first, following with coal and iron.

Arizona.—For the Arizona exhibit a collection of gold, silver and copper ores from almost every mine in the Territory has been made. In addition, the United Verde, the Copper Queen and the Val Verde smelting companies show finished and semi-finished products, in the form of converter bars, copper bullion, lead bars and the like. The exhibit also has a large number of photographs of mills and mines, and in this way presents some interesting phases of work in the Southwest. The series of articles on Arizona districts, recently published in this JOURNAL, leave comparatively little to be said here. A variety of specimens of petrified wood and other fossil curiosities, help to fill the cases. Some fine, long-fibered asbestos is also shown; it is from the Grand Cañon, but no information was attainable as to the extent of the deposit or the quantity of the mineral so far developed.

California.—The California section is under the competent direction of Mr. Lewis E. Aubury, the State mineralogist, who supervised the collection and arrangement of the exhibits. In doing this work Mr. Aubury's object was not to give undue prominence to the gold mining interest, the extent and value of which is already well known, but to bring forward as much as possible the less generally appreciated mineral resources of the State, which are now adding largely to the value of its yearly production. The gold exhibit is not limited to ore specimens, but includes some excellent working models supplied by the State. One shows the working of a drift mine, of the class found in several counties of the State. Another shows a gold stamp-mill, with amalgamators and concentrators attached. A third illustrates one of the primitive stamp-mills used in the earlier days, being copied from a mill erected in 1853. A fourth model, very well executed, and furnished by the Pacific Tank Company, of San Francisco, is a working model of a complete cyanide plant, with tanks, settlers, zinc-boxes and all the fittings. These serve to illustrate the processes now in use for the recovery of California gold. Maps and photographs assist in the illustration. Statistical diagrams and tables furnish the visitor such further information as he may be in search of. Other machinery in connection with this exhibit includes rotary mills, a stamp-mill and concentrating plant, concentrators of several types and hydraulic giants.

The second great interest of the State—the petroleum industry—is represented by a fine collection of oils from the different fields. These are carefully arranged, to show in each case the crude oil, in association with its various products, as refined illuminating oil, lubricating oils, the lighter hydrocarbons, such as benzine, naphtha and the like, the heavy residuum and the fuel oils, both crude and residual products. Geological sections and samples taken from borings of the oil strata and overlying rocks illustrate the occurrence of the oils. A model of a well-drilling rig and numerous photographs combine to give an idea of Californian methods of searching for petroleum, and drawing it from the wells. Maps of the oil-fields, of the pipe-lines and other methods of handling and transportation complete the exhibit.

The kindred asphalt industry also finds a fair representation in the way of specimens and descriptions of deposits.

The copper mining industry of Shasta and other counties is illustrated, and there is metal from Keswick and other smelters, besides some fine specimens of ore.

Of the other products of the mines there is an excellent showing, including magnesite, chrome ore, gypsum, lime, ochers, infusorial earth, salt and many minor products. These show the variety of California minerals and ores which are now being exploited. A pyramid of lepidolite from the southern part of the State draws the attention of visitors. A rather exaggerated combination of borax in its crude and refined forms is the work of the Pacific Coast Borax Company. Clay products constitute a valuable addition and serve to show the proficiency of California potters, as well as the excellence of the raw material.

The variety and value of California building stones, which are hardly appreciated, even at home, is well shown here. The pavilion in which the exhibit is placed has been used to illustrate this; in its construction are includeed granite, limestone, sandstone and some very fine marbles. The granite from Los Angeles, Madera and Sonoma counties is a fine-grained stone, taking a good surface polish, and equal, apparently, to the best stone from Maine. Some excellent roofing slate is also in evidence.

Among other products are specimens of cinnabar from Colusa and Lake counties, high-grade manganese ores and some antimony ore, chiefly stibnite.

Upon the whole, the California exhibit is a well-balanced one, well designed and arranged. It deserves credit for its comprehensiveness and its representative character. This is even more the case than appears on the surface. The board of commissioners was chiefly representative of the agricultural interests, and was not willing to allow the miners a fair share of the appropriations, or to encourage their interests in any way. The unfortunate feeling of hostility, which grew up in the days of the heated anti-debris controversy, has not yet subsided sufficiently to give either side a fair appreciation of the other.

Colorado.—The Colorado exhibit is confined to a well-arranged, carefully-labeled collection of specimens of the very great variety of ores and minerals found within the limits of the State. The Bureau of Mines certainly deserves credit for this; there is no exhibit in the building in which it is so easy to identify and place specimens as in this, notwithstanding their great number and variety. An attraction to the public is a case full of fine specimens of leaf and wire gold from Farncomb hill, Breckenridge. Every district and apparently almost every mine in the State is represented in these cases, and the variety of mineral is almost endless. The pavilion which surrounds the exhibit is of Colorado stone, and includes some beautiful samples of onyx, or onyx-like marble.

Iron and steel are represented by ores, pig iron and finished steel from the Colorado Fuel & Iron Company. There are some samples of coal, and a section about 8 ft. thick from the vein, taken from one of the newly opened mines in Routt county.

The machine-builders of Denver are well represented, as will be seen on another page.

The premier gold mining State might have had a more instructive exhibit, illustrating processes adopted in various districts and the reason for them. What has been done has been well done, but it is a little disappointing to the visitor.

A rather neat "side-show" is a small-sized model of a Gilpin county gold mine, illustrating methods of stoping, pumping, trucking and hoisting. This has been allowed a place in the building, on a side aisle.

The School of Mines, at Golden, is preparing a separate exhibit, in what is known as the Metal portion, a little way outside the Mines Building. This is expected to show processes of sampling and assaying ores and the methods of reduction. It will doubtless be of much interest when ready. The building is to be finished and ready to open early in July. Colorado mines and manufacturers will also be represented in The Gulch exhibit.

Clays and clay products have their place, and the fine work done by the potters is quite a surprise to those who have not been familiar with the progress made in this department in the West.

A fine collection of gem-stones and gem-like crystals is also very attractive to the general public.

Among the other metals, copper from the Denver and Pueblo smelters finds a place in the form of ingots and other work.

Georgia.—The Georgia State exhibit is a carefully arranged selection of ores, minerals and building stones from various parts of the

State, some shown by individual companies and others by the State Museum, at Atlanta, and by the State Geological Survey. The Survey exhibit includes specimens of bauxite, pyrite, iron, lead, copper and manganese ores from north Georgia; a number of handsome specimens of crystals and semi-precious stones; with gold ore and nuggets from Lumpkin county. The State Museum exhibit also includes a number of photographs and a collection of books and monographs relating to the mineral resources of the State. Some of the marble shown, notably that from the Tate quarry of the Georgia Marble Company and from the quarry of the Kennesaw Marble Company, near Marietta, is of very fine quality. The Geological Survey deserves credit for the systematic arrangement and the careful labeling of the specimens shown. There is however, very little information obtainable as to the actual condition of mining in the State.

Idaho.—The Idaho exhibit, like the Georgia, is chiefly confined to specimens of ores, crystals and mill products from various sections of the State. This includes silver ores from the Coeur d'Alene, gold and silver ores from a number of other districts, iron pyrite from kinds, with some very fine marble and a few specimens of onyx. Clay and clay products are also included in this exhibit.

The Montana School of Mines shows some fine cross-sections, or rather glass models, of the Anaconda, the Parrot and several other mines in the Butte district. These models are well executed and so displayed that they can be easily studied. Some of them, we believe, had been prepared in connection with the various mining suits which have been going on so long in Butte. They are so arranged as to show the extent of the extra-lateral rights involved in those controversies.

Among the photographs were several showing gold dredges at work. These are contributed by the Jeffrey Manufacturing Company, of Columbus, O., and the Vulcan Iron Works, of Toledo, whose machines are employed in these pieces of work in the Montana placers. A small model of the Wethey calcining furnace also finds its place in the group of exhibits from Butte.

The great number and diversity of the exhibits shows that nearly all the working mining companies in the State have been contributors.

THE ELECTRICITY BUILDING.

Blaine county, and a handsome collection of gem stones from a locality not named. The students of the State University, at Moscow, contribute a model of a stamp-mill concentrator and equipment, which is very carefully executed, but, unfortunately, rather too small to show the details as fully as might have been done on somewhat larger scale.

Montana.—The Montana exhibit is, in one respect, very full, so far as showing the varied mineral products of the State and the different minerals found. No working machinery is directly connected with it, however, although a number of fine photographs is included, showing mills, mines and machinery. The great copper companies of Butte contribute, besides these photographs, piles of copper ingots, silver bars and similar products. The ores shown come from all parts of the State, and included almost every variety of gold, silver and copper minerals. It may be said that the whole exhibit is well arranged, so far as display was concerned, and that its appearance is very attractive. A complete list of specimens, however, would be interesting only to a mineralogist. The State has a special exhibit in which were included, besides gold, silver and copper, specimens of iron ores, coal, corundum, sapphire, graphite, gypsum, limestones and building stones of different

Nevada.—The chief features in the Nevada collection are found in the State cabinet, which includes, not only ores, but minerals in great variety. Gold and silver ores, from various sections, are much in evidence; but ores of rarer metals, such as molybdenum and tungsten are to be seen. One or two samples, said to be tin ore, are also shown. Of non-metallic products, there are salt, sulphur, corundum, feldspar and many varieties of building stone. The latter includes some handsome specimens of marble and onyx.

The soda and borax deposits were represented by crude and finished products in various forms, and by maps and photographs.

The State's special collection includes some interesting historical matter, such as maps and profiles of the Comstock lode, with a number of photographs of the older mining camps and plants. The collection of photographs were brought down to the present day, showing something of the recent developments and of the revival of interest in Nevada mines. Mr. J. A. Yerington contributes a number of mine maps and some small models, while Mr. Philip Neidesheimer furnishes a model showing methods of timbering adopted on the Comstock.

Nevada has many mineral products which may become valuable assets when the State is better supplied with facilities for transportation. Among these are gypsum; silica in various forms, as infusorial earth; cement making materials; pyrite; fire-clay; salt and phosphates. Few States, probably, can furnish a greater variety of building stones. Some of the deposits will be opened up by the completion of the new railroad from Los Angeles to Salt Lake, which crosses the southern part of the State.

New Mexico.—The exhibit of this Territory is relieved from the dead level of a collection of specimens by the School of Mines at Socorro, which furnishes an admirable and very interesting geological map, in addition to a well-assorted case of specimens of different kinds. The Territory also exhibits geological and topographical maps with profile and photographs, which were well worth study. The collection of ores furnished by different mining companies includes copper ores, together with copper matte and other products in various stages: gold ores, silver, zinc-blende and lead-zinc-silver ores and their considerable variety. Iron ores are also shown from different localities, with a few specimens of asbestos among the rarer minerals. Of the non-metallic products gypsum, salt, sulphur magnesite and a fine mass of refined sulphur found a place.

A very handsome collection of turquoises attracts much attention outside the building in the Gulch. The Porterfield Turquoise Company has a special exhibit which includes a section of a mine underground, showing the nature of the matrix in which the turquoises are found and the method of separating them from the matrix. This, it is claimed, is an exact reproduction of a portion of the mine, and certainly looked very natural. New Mexico set a good example by furnishing an excellent collection of literature on the geology and mineral resources of the Territory, which visitors were at liberty to consult.

North Carolina.—The State of North Carolina, as is well known to geologists, contains within its borders a remarkable variety of minerals, including crystals, with gems and semi-precious stones. A collection of these could not fail to present an interesting appearance. Part of this collection was contributed by the State Museum at Raleigh; a part by the Geological Survey Museum in the State University at Chapel Hill. The exhibit was arranged by, and is under charge of, Mr. Sykes of the Geological Survey, and its study was very much aided by his explanations. It is also a somewhat curious fact that, though North Carolina has been a gold producer on only a modest scale, it has been remarkable for the number of large and valuable gold nuggets found within its limits. Fac-similes of a large number of these nuggets are displayed, together with some genuine ones, and this collection formed a very interesting record. Outside of the features which have been mentioned, some excellent specimens of mica in blocks as mined, and also in trim and finished form, are noted. A fine collection of building stones, including granite, marble, limestone and sandstone were presented also. Among other products for which the State is noted were talc, corundum and garnet, which were all well represented. The North Carolina Talc & Mining Company has an excellent collection, showing the crude talc, fibrous talc, powdered and purified mineral, and various articles manufactured from the same.

Another special product of the State is

found in monazite crystals, shown both separately in placer gravel and in the rock which forms the original gangue. Kaolin and potter's clay are also found in the collection. Iron ores from the Cranberry district, chiefly magnetite, with pig iron from the Cranberry furnace, are also exhibited.

The Geological Survey exhibits a relief map of the State, which is well executed, although the scale was rather small, making it a little difficult to study without close observation.

In the North Carolina section there are also shown tin ores and concentrates from Gaffney in South Carolina, where the only tin mine at present operated in the United States is situated. South Carolina has no exhibit of its own, so that the tin finds a place with the neighboring State. Upon the whole, while it presents no very striking features, the exhibit is a credit to the State which furnished it.

Oregon.—The Oregon exhibit is somewhat marred by the evident attempt to advertise certain mines in the Baker City district by the display of gold nuggets and gold quartz supposed to come from their workings. These have been put into such prominent position as to detract rather from the value of the exhibit as a whole. Outside of these a number of mining companies make a creditable showing of specimens, but there is no special feature.

South Dakota.—As was to to be expected, the more noticeable portion of this State's exhibit comes from the Black Hills region, the contributors including almost every mine in that region, which is sufficiently well developed to furnish specimens. Outside of these collections the Mining Men's Association of the Black Hills shows some very interesting relief maps of the region, indicating also its general geology and the location of the mines and of the different transportation lines. This relief map is very well executed and clear enough to furnish an interesting study. A number of photographs of mining plants and transparencies are also shown.

In the Gulch a gold-reduction plan for amalgamation and cyanide treatment is almost ready, but not yet in full operation. At the time of the writer's visit, this plant was intended to show the methods adopted at many mines in the Black Hills. It is well placed and completely equipped, and will doubtless be of much interest to mining men from other districts. In addition to this a full-equipped five-stamp mill, with Bartlett concentrating tables to run on Black Hills ore, has been erected in the Gulch by the Colorado Iron Works, of Denver. Both of these plants will be operated, for at least a portion of the time, on ore brought from South Dakota mines, so that visitors will be able to see the whole process of winning the gold from those ores.

Texas.—The Texas exhibit deserves notice for its careful and logical arrangement and the admirable manner in which it is presented. It has been prepared by the Geological Survey, under the direction of Dr. Wm. B. Phillips, the head of the Survey; and, although he is unable to be present in person, he is well represented by an assistant from his office, Miss Patrick, who is thoroughly acquainted with the collection. Among the ores shown are cinnabar from the Brewster county district, iron ores from Llano, Cherokee and other counties, silver ores from Presidio, lead ores from El Paso, Burnett and Presidio, and some small samples of tin ore from El Paso county. There is also a collection of asphalt rocks from Uvalde, Burnett and other counties, with a number of samples of lignite from Texas mines. The collection of oils from the different districts is very complete, and has been carefully arranged on the same plan as the Standard Oil exhibit, crude oil from different wells being shown in connection with the products of refining. The exhibit of fuel oils is an interesting one, and the samples of the products used for locomotive and steam purposes are carefully distinguished. Other exhibits include salt, sulphur, clay and clay products; while a very large collection of building stones has been carefully prepared in such a way as to show together the rough stone, the finished surface, and, in many cases, the polish which could be given the stone also. These include marble, limestone, sandstone and very fine specimens of granite. There are also some large blocks of lithographic stone from Burnett county. Cement and cement material, the production of Texas, are not forgotten.

A feature which attracts much attention from casual observers is a large iron pot, containing 1,200 lb. of quicksilver from the mines of the Marfa & Mariposa Company. To show the nature of the metal a large steel ball and an iron plate float on top of the quicksilver, furnishing an endless source of wonder to the visitors.

Another feature of interest is a collection of minerals from western Texas which have been proved to possess radio-active properties, and which may possibly prove to be sources of radium. Among these minerals are specimens of gadianite, fergusonite, allanite, cyrtillite, yttriolite, uranium ocher, nivenite, thoro-gumite and mackintoshite. All of these have been tested for their radio-active properties, and all possess those properties in a greater or less degree. Other rare minerals are represented by a number of specimens of molybdenite.

The clay exhibit has been arranged and classified by Mr. H. Ries, who has made a number of tests of Texas clays and prepared a monograph on the subject. As a specimen exhibit this is one of the finest in the Mines Building.

Utah.—The Utah section is under the charge of Dr. Robert H. Bradford, professor of mining and metallurgy in the State University. The large collection of ores and minerals represents almost every mining district in the State. Gold, silver, lead and lead-zinc ores are shown from many districts, with copper ores from Bingham and other camps. There are some fine specimens of iron ores from the southern part of the State. Ozokerite finds a place, with some samples of crude and refined sulphur, furnished by the Utah Sulphur Company. Some fine alabaster is in evidence, together with gypsum and lime. Building stones in considerable variety are also illustrated by specimens. Clays, including kaolin, and clay products show that Utah industries are not confined to mining.

Coal and coke from the Pleasant Valley mines serve to show something of Utah's fuel resources.

Some variety is given to the exhibit by a mold of a stamp-mill and concentrator, which will be in operation later on.

The Utah exhibit is doubtless intended to show the varied resources of the State. It is as successful as could be expected from a collection of this kind.

Washington.—This State makes a rather small but well selected exhibit, comprising gold and silver ores from Ferry, Okanogan, Pierce, Snohomish and Stevens counties. Arsenopyrite from Snohomish county, with refined arsenic now made there, is also shown. King, Pierce and Skagit counties have coal and lignite specimens and some illustrations of mines. Coke made from Washington coal was represented, though the State furnishes good coking coal only from a few mines. Iron ores, including hematite and magnetite, illustrated the possibility of building up an iron industry on the Pacific coast in the future.

Other exhibits included clays of various qualities, fire-clay, cement materials and building stones.

Wyoming.—The Geological Survey of this State furnished an interesting collection of maps, charts and photographs—many of them colored—to illustrate the geological features of the State. An interesting pamphlet, prepared by State Geologist H. C. Beeler, was also given to visitors.

Coal has heretofore been the chief product of the State, being used all over the West, and is noted as the highest grade of steam coal obtainable in quantity, as the Rock Springs field in Sweetwater county has been famous for its coal ever since the Union Pacific Railroad was built through Wyoming in 1867. This coal occurs, geologically, in the lower Laramie Cretaceous sandstones, and it may be stated that this Laramie Cretaceous formation contains 90 per cent of the coal of Wyoming and is found in all of the 13 counties of the State, giving a coal-containing area estimated at 20,000 square miles, with three to nine veins of coal, varying from 2 to 15 ft. in thickness, with a working average of from 5 to 7 ft. Most of this coal is a lignite and undeveloped, though prosperous shipping mines have been opened up in all parts of the State, and the quality and amount of coal is an assured fact.

The iron deposits of Wyoming may be better expressed in square miles than in acres, but with the exception of the mines at Sunrise, in northern Laramie county, are yet undeveloped. At Sunrise a town has been built, with a railroad to connect with the Burlington & Missouri River Railroad and the Colorado & Southern, and a permanent plant established. This plant is owned by the Colorado Fuel & Iron Company, and is the main source of supply for the iron ore used in the great steel works operated by this company at Pueblo, Colo.

The ore is mostly a red hematite, as is shown by a glance at its contents, and it is admitted to be one of the best ores known for making bessemer steel. Mining has been done entirely by steam-shovels handling about 2,000 tons of material per day, but a new operating shaft has been sunk to develop the lower ores and do away with the open-pit methods. About 500,000 tons of this crude iron ore has been mined and shipped. The ore is found in huge flat deposits in the Carboniferous limestones in a district covering 20 square miles. Diamond drills have been used to determine its extent and value, and unnumbered tons have been found to exist, as yet untouched.

Other large deposits, still unworked, exist at Leminoe, while there are also large areas of titaniferous ores.

Gold mining in Wyoming has had varied success, though there are some placers which have yielded considerable amounts, and some good mines have been developed, such as the

Carissa, which was famous for a time. Copper mining has also been pursued with varied results; at present there is promise of good yields from two or three mines in the Encampment district, which are being worked on a large scale.

The existence of valuable oil-fields in Wyoming has also been proved. At present their development is delayed by lack of transportation.

An interesting feature of the economic geology of the State is found in the soda lakes. Under this head are included both sodium and magnesium soluble salts found in beds or lakes in Albany and Carbon counties and the soda wells at Green River in Sweetwater county, but these are aside from numerous salt springs scattered all over the State. The lakes have an estimated area as follows: Sulphate of sodium, 340 acres; sulphate and carbonate of sodium, 528 acres; magnesium sulphate, 160 acres. These lakes are simply crystallized materials from the water caught in natural basins and then exposed to evaporation, leaving the minerals in beds from 8 to 10 ft. thick in the center, becoming thin at the borders of the deposits.

All these resources, as well as a great variety of clays, cement materials and building stones, are illustrated in the exhibit and described in Mr. Beeler's pamphlet.

In the loose and general classification in which we have grouped the States, there are a few which stand midway between the gold and silver producers, and those which are noted chiefly for their coal and iron resources. As we have said above, this classification is necessarily a very loose one, since a State mining coal and iron as its principal products may nevertheless have many other minerals which are valuable from an economic point of view, and it would be impossible to make a strict classification without going into a tedious subdivision. Among the States of what might be called the middle group, we find the following, a number of which present interesting exhibits:

Kansas.—This State shares with Missouri the great southwestern zinc-producing district. There are a number of zinc mines in the State, and large smelting works have been brought there by the existence of natural gas. Other resources of the State which are of leading economic value are coal, found chiefly in the eastern portion, petroleum, natural gas, above mentioned, gypsum, cement, lime, and a great variety of clays and salt. The State Geological Survey illustrates these resources by maps, showing the geology of the State, the oil and gas-fields and the mineral belt of the eastern part. The gypsum industry makes a prominent display with specimens of land plaster gypsum, of various qualities, and gypsum refined and prepared for market. The methods of this work are illustrated by models of plaster kettles in which the refining is done, and by photographs of works. The salt industry also displays photographs and specimens.

The zinc smelters of the gas belt provide samples of metal, zinc-dust and various other products in some variety. One prominent smelter has a separate exhibit, which will be mentioned in another column. The petroleum resources are illustrated chiefly by samples of oil.

A special Kansas industry is the manufacture of glass, which has been undertaken in the State largely on account of the existence of glass-sand of fine quality. Several companies show finished articles, while the special State exhibit includes silica and glass-sand from a number of places.

The variety of clays in the State, and the extent to which they are utilized, are shown by bricks, building blocks and other products of fine quality. The cement exhibit is also a varied one; with this, building stone, chiefly limestone and sandstone, are well represented.

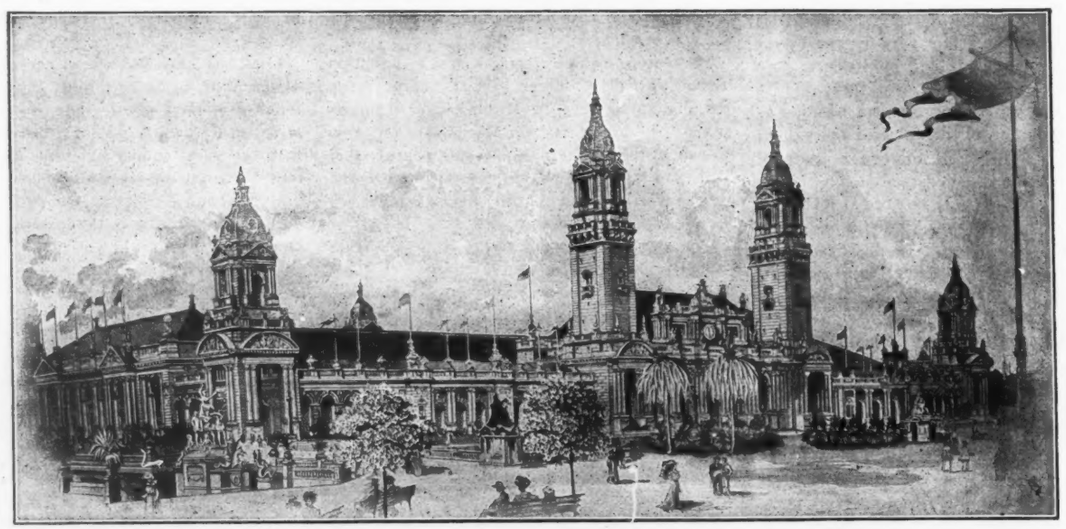
The coal mining companies occupy only a comparatively small space, and confine their exhibit to specimens and a few photographs. A special exhibit is made of copper sulphate from the smelting works at Argentine, so arranged as to show the various stages of manufacture. This sulphate, of course, although made in the State, is not a product of Kansas ores. The United Zinc & Chemical Company, at Argentine, also shows salt cake and other chemical by-products.

Louisiana.—The Louisiana exhibit is confined to the chief mineral products of the State, salt, sulphur and oil from the recently discovered fields. The salt from Avery's Island and Anse la Butte is shown in large blocks, part of the wall enclosing the exhibit being composed of blocks of salt, just as taken from the mines. A not very artistic statue of Lot's wife crowns the salt exhibit. The sulphur producers make a large showing of fine sulphur. An attempt to rival the salt men, however, by a statue of the devil in crude sulphur was not successful, His Satanic Majesty having crumbled to pieces under the influence of dampness, or some other disintegrating cause.

Building stone, with brick and other clay products, complete this exhibit. Some small samples of minerals which Louisiana is not generally supposed to possess are found in specimens of coal from the Dolette Hills, and iron ore from Lincoln, both places being in the northwestern portion of the State.

Missouri.—As would naturally be expected, this State has a large exhibit, part of which is due to the State authorities and part to the enterprise of the School of Mines at Rolla. This exhibit contains in fact the only actual working machinery found in any of the State exhibits in the Mines Building. The School of Mines has in place, besides a large number of photographs showing mines, machinery and geological features, a complete concentrating plant for lead and zinc ores, having a capacity of 60 tons a day. The screens, jigs, rolls, etc., required for this plant were furnished by the American Concentrator Company, of Joplin. At present the plant is operated only occasionally, but later on it is expected to have a fuller supply of ores, when the visitor will be enabled to see it at work every day. The latest improved method of concentrating and separating the lead and zinc ores of the Joplin region can here be seen. In connection with this exhibit also is a magnetic separator of the type used in separating some of the ores in the Joplin country. The School of Mines also has an assay laboratory furnished with all the necessary apparatus for making tests, and also with diamond saws for making petrographic sections. In connection with this exhibit also are samples of Joplin 'dirt' or crude ore as mined, the concentrated ore and some very fine masses of zinc-blende, or 'jack,' from the Joplin district. Ores from the southeast Missouri lead district are also shown.

It may also be mentioned that there is under



THE MACHINERY BUILDING.

erection and nearly completed in the Gulch a Joplin mill of the type commonly used in the smaller mines of the region, including crusher, roughing rolls, finishing rolls, jigs and concentrators. This is later to be in full operation, so that the visitor will be able to study Joplin methods in two places. Private enterprises has also supplied, on a hillside in the Gulch, the representation of a southwest Missouri mine, showing methods of timbering, mining, haulage and the like. One face in this mine model, as it might be called, is built up with ore brought from the region itself, showing what would be, in actual existence, an extraordinary find.

Among other exhibits of the School of Mines are shop work done and chemical compounds made by the students. There is also a collection of rocks which have been tested and approved as road-making materials.

The State itself supplies a model of an elevated tramway, or trestle, with cars extending entirely around the exhibit, and taking the place of a railing. A number of geological maps, mining views and tables of mine statistics are also displayed. Brick, tile, terra cotta and other clay products, with fire clays and fire brick make an additional display. There is also a large selection of specimens of coal, manufactured cement and of building stone, including granite, marble, limestone and a few specimens of onyx. The coal operators of the State have a large model of the surface works and tipple at one of their mines, showing the arrangements adopted for separating coal into lump, nut and slack, the usual grading of bituminous coal in the West. The Missouri exhibit, from a point of view of practical instruction, is fully equal to any in the building.

Nebraska.—This State is not in any sense a mining community, and its exhibit is confined chiefly to samples of building stone, diatomaceous earth, cement materials, clay and clay products, and the like. Some curious fossils are included, and the clay products show that Nebraska brick-makers are skilled in their art.

New Jersey.—Most of the excellent exhibit made by this State is due to the New Jersey Geological Survey. In addition to a large and very fine relief map of the State, there are relief maps or models on a larger scale of several interesting sections from Sussex and Warren counties, and from the Coastal Plain region of South Jersey. A large number of maps, charts and photographs are also shown, together with files of geological reports, apparatus for making rock sections and other office apparatus in use. The Survey also presents a systematically arranged collection of rocks and minerals, building stone and road materials from all parts of the State, roofing slates from Sussex county, fire clay, glass-sand and other industrial materials. The ores shown are principally iron ores from Hibernia and Netcong, and a collection of the complex zinc ores from Franklin Furnace.

Other exhibits consist of portland cement made by several different companies, brick, firebrick and other clay products, including terra cotta and tiles. A model of a clay washing plant illustrates some of the methods employed in this industry. Rather curiously, the great pottery industry of Trenton and vicinity has small representation.

New York.—This again is not a mining State, properly speaking; at least mining constitutes only an insignificant portion of its industries. The mines proper are chiefly represented by pyrite from St. Lawrence county, zinc-blende, galena and chalcopyrite from the old Ellenville mine, graphite from Ticonderoga and iron ore, crude and concentrated, from the Lake Champlain region. This seems rather a brief list, but the State nevertheless manages to occupy a considerable space, in which are shown a variety of building stone, marble, limestone and sandstone, building slates from the slate district south of Lake Champlain, talc from the Gouverneur district, and some other products. Salt from the salt wells of the central portion of the State is furnished also by a number of companies. An interesting exhibit is that of the Solvay Process Company, illustrating the great variety of chemicals derived from salt by the electrolytic process, and also the methods used in the manufacture. Cement from the Hudson river region is a prominent feature, and there is also a large exhibit of gypsum and land plaster, which are produced in the State in large quantities.

The New York State Museum, at Albany, besides several cases of classified specimens, shows some interesting rock sections with footprints of prehistoric birds and animals. The museum has also a large collection of geological and other maps, photographs, reports and scientific publications. Aside from this, the State furnishes a library of literature on New York minerals, with reports on water resources and other points.

North Dakota.—The only mining exhibits, properly so called, from this State are specimens of lignite. The rest of the exhibit includes chiefly clay and clay products, with a few samples of building stone.

Oklahoma.—This Territory is not yet a mining section, although some prospectors claim that valuable mineral deposits exist; in fact, samples of lead ore, copper ore and iron ore are found in the collection. Gypsum, clays and a variety of building stone make up the exhibit. It is completed by a relief map of the Territory and a model on a large scale of the gypsum hills of Blaine county.

Wisconsin.—The portion of the Gogebic iron range in Wisconsin furnishes some excellent specimens of hematite and other iron ores. The zinc district of South Wisconsin also sends a number of ore specimens with a glass model and cross-sections illustrating the occurrence of zinc and lead ores, which are now beginning to be exploited on a very considerable scale. The Baraboo iron range is represented only by cross-sections of the district constructed on a basis of the diamond drill borings carried out there.

The rest of the exhibit consists mainly of structural material, such as stone, cement and brick, with a large number of photographs and maps showing geological sections of various minerals.

We come now to the coal and iron producing States. As mentioned above, the classification is necessarily a very loose one, and many of the States already mentioned do produce and exhibit coal and iron ores. The States following, however, are those in which coal or iron, or both, are the predominating interests. There is, of course, some mention of other minerals included in the descriptions.

In this section the most noticeable feature, apart from the fine exhibits made by several States and by independent companies, is the absence of any representation of the United States Steel Corporation. We have already commented upon this, but cannot help referring to it again.

The States included under this heading will be found below.

Alabama.—The Alabama exhibit differs from that of many other States, in that it is due entirely to private enterprise. The legislature, unfortunately, neglected to make any appropriation, but the matter was taken up by some prominent men connected with the mining interests, under the leadership of the Commercial Club of Birmingham; the Geological Survey of the State co-operated, and the result has been a most creditable exhibit. It is under the charge of Mr. McKnight, of Birmingham, assisted by Mr. Anderson, of the Geological Survey.

The most prominent thing in the exhibit is the great figure of Vulcan, a specimen of the skill of Alabama foundrymen. This figure, which is strongly and well designed, represents Vulcan standing beside his anvil, hammer in hand, while in the other hand he holds a spear-head just completed. The colossus is 56 ft. in height and weighs 120,000 lb.; it was cast in 20 sections, which have been so carefully joined and cemented that many visitors believe that it was cast in a single piece.

Vulcan is not the only exhibit, however. The Tennessee Coal, Iron & Railroad Company and the Republic Iron & Steel Company have each a complete series of iron and steel products, showing the raw material-iron ores and coke-pig iron, finished iron, steel and steel products, all carefully arranged to show the sequence of the various processes. The Ensley steel works, of the Tennessee Company, show steel rails of various sections, made from basic open-hearth steel; including rails which have been tested by drop, and others which have been tried by torsion and bending. The result shows the quality of the rails.

Many fine specimens of Alabama coal are on exhibition, with a quantity of coke made from them. Samples of limestone and dolomite are also found. Iron ores, including red hematite, brown limonite and other varieties, are shown.

In addition to coal and iron, the building stones of the State and the clay industries are given room in the form of numerous blocks used in arranging the space allotted to the State, and in samples of drain-pipe and other manufactured articles. The Geological Survey has a carefully arranged collection of cement-making materials, including limestone of several varieties and clays; also cement as clinker, in the process of manufacture, and cement ready for market. The State possesses a large area of limestone, some of exceptional purity, while clays of good quality are found in convenient proximity, so that the making of cement can be carried on, under conditions, unusually promising.

Almost every visitor to the Mines Building stops to look at Vulcan, so that the State receives rather more than its due share of attention, from the general public.

Adjoining—and really forming part of—the Alabama exhibit is that of Rogers, Brown & Company. In this a number of specimens of pig iron are seen, with a careful statement showing the methods of grading iron. The latter are little understood, outside of a few technical people.

Arkansas.—This State shows its coal interests prominently. Specimens of anthracite from Spadra and of bituminous coal from various mines are seen. There is a model of Mine No. 18 of the Western Coal & Mining Company, at Jenny Lind, which was described and illustrated in the JOURNAL for April 7 last.

The zinc deposits of northern Arkansas are represented here by specimens, some very fine, and efforts have evidently been made to show them as well as posible. The blende and other ores have been well selected, evidently.

Other ore specimens are iron, pyrite, manganese and antimony, or stibnite. Among the minerals shown there are various forms of flint and whitestone. Fuller's earth and silica are found in the State and represented here. Cement, clays and clay products make up the list. A recent discovery is phosphate rock, also shown here.

Indiana.—The Indiana exhibit, though rather prominent in the center of the building, is not a considerable nor an enlightening one. It consists of a large tower built of blocks of coal from various mines, with a portal having some attempt at ornament, and some blocks of building stone, chiefly oölitic limestone from the well-known Bedford district.

Indian Territory.—The Indian Territory makes a creditable showing, which is chiefly due to the Choctaw Coal Operators' Association. Mineral ores include lead and zinc ores from the Choctaw Nation and manganese and iron pyrite, and some handsome specimens of iron ore. The coal and coke is well represented by blocks and samples from all the principal mines in the Territory. Oil and oil sands from the Cherokee Nation illustrate a comparatively new discovery in the Territory, which promises to be valuable, and which has engaged the attention of many operators. In connection with this there are also some fine specimens of crude asphaltum. The exhibit is rounded out with granite, sandstones and some other building stones, while there are also some interesting maps and diagrams.

Iowa.—The State of Iowa leads in this pavilion with a number of mine maps and photographs of coal mines, quarries and clay works, besides the usual collection of specimens of mineral products. The coal mines naturally have a prominent part as representing the most important mining industry of the State, as there is coal shown in blocks and other forms by mines from all sections. Another important industry is gypsum, which is found in several portions of the State, as is evidenced by numerous specimens. The clay industries of Iowa are extensive, almost all kinds of clay being found within its area, and accordingly clay and bricks of various kinds are found on exhibit. Prominent among these is paving brick, with which Iowa supplies a considerable portion of the West, and which serves to make up for the absence over a large part of the State of good stone and paving material. That stone is not entirely absent is suggested by a number of quarry products carefully prepared and arranged to show their quality. The only mineral ore displayed is lead ore from the southeastern part of the State. A large block of lithographic stone represents a new discovery which is said to have much prospective value.

Kentucky.—The Kentucky exhibit, which was arranged under the supervision of Mr. Chas. J. Norwood, the head of the Geological Survey, presents a very attractive appearance, and full explanations are to be obtained from Mr. Norwood, or from the competent assistants who are present. The leading features of the exhibit are the coal and cokes of the State. The cannel coal, which is peculiar to Kentucky, is utilized to make an ornamental entrance to the pavilion, and other coal is well arranged. Coking coal is shown in connection with the coke made from it, tests and analyses being also furnished. The Eureka colliery of the Reinecke Coal Company has an excellent model of the surface works, and a portion of the mine at Madisonville, which attracts much attention; and altogether the Kentucky coal men are well represented.

The oil wells of the State, which are now in process of development, show a collection of oils, both crude and refined. Prominent among these are the Atlantic & Pacific Oil Company, at Barbourville, the Caney Creek Oil Company, at Lexington, and the South Kentucky Oil Company, at Glasgow. Allied to this is asphaltic sandstone, which has been used in Louisville and other cities for paving purposes.

The fluorspar companies, of northwestern Kentucky, have some very handsome specimens. These are accompanied by lead and zinc ore, barite and other minerals. Iron ore and ocher complete the showing of metallic minerals.

The building stone exhibit, carefully arranged by the State, includes limestones, sandstones and marble, together with a large block of lithographic stone, the existence of which in Kentucky has heretofore been referred to at length in the JOURNAL.

A very fine grade of molding sand found near Newport, which is known for its excellent qualities all over the United States, is exhibited in company with some excellent castings for artistic work made with its aid. Cement and cement materials are also given considerable prominence, as are the clay and clay products, the latter being of very fine quality.

Maryland.—The most interesting part of this display is furnished by the State Geological Survey, which presents a very fine collection of maps, charts, sections, photographs and models, illustrating the geological and topographical features of the State and their relation to the mineral deposits. These are accompanied by collections of reports on the geology of the State and the mining and mineral conditions. The Survey also has systematic collections of Maryland rocks and fossils; ornamental and building stones, sands, clays, kaolin, flint and feldspar, copper and iron ores and coal. These are accompanied by samples of manufactured products made from the different raw materials.

The coal mining companies of the Cumberland and Georges creek region are all represented by specimens, photographs and other exhibits.

An interesting showing is made by the slate producers of the Peach Bottom region, a small but valuable district, which produces slate of the finest quality. Other building stones are shown by various companies. Lime and cement also form prominent features. Iron ore is presented by the Muirkirk furnace, and also by the Blue Mountain Company, which has a mine in the Catoctin valley. These mines have been recently re-opened after long disuse, and other mines in the Linganore and Long Green valleys will probably follow the example set in the adjoining region.

The clays of Maryland have a wide range in quality. They include refractory clays, kaolin, pottery clays and brick clays of almost every quality. This class of raw material has been utilized in few States better than in Maryland, and the display made by the different companies is very attractive.

Michigan.—As might be expected, the exhibit of Michigan is very largely from the Upper Peninsula, where the copper and iron mines have rivaled each other in presenting samples of ores and finished products. Nearly every prominent mine in the copper country is here represented, and the visitor can see the different copper-bearing rocks in their native condition, the crushed rock from the stamps, the mineral as concentrated from the stamp product and, finally, the copper as smelted from the mineral. The different classes of rock, from which the native copper is obtained, amygdaloid, conglomerate and epidote are clearly distinguished. There are some fine samples of small masses of native and crystallized copper, and of some peculiar minerals found in the rock, including mohawkite and keweenawite. The operating side of the copper mines is illustrated by several excellent models on a scale large enough to show actual operation. Included in these are the model of the Calumet & Hecla stamp-mill, and the combined rock and shaft house at the same mine. There is also an excellent model of the Tamarack rock and shaft house, showing the most approved construction now adopted in the copper region for such structures. The Michigan College of Mines furnishes a number of maps, showing topography and mines, mainly prepared by the students of the college.

The iron miners of the Upper Peninsula also make a fine display of specimens, though perhaps not so complete as that of the copper men. It is very interesting, however, showing the various classes of ores mined at the Marquette and Menominee ranges, and in that portion of the Gogebic which lies within the limits of Michigan.

Adjoining, and really forming a part of, the Michigan section, is the exhibit of the Cleveland Cliffs Iron Company. This has been carefully designed and well arranged, and presents an interesting study for the visitor. The general situation and chief features of the company's properties are shown by maps and some very fine photographs. Statistics of the output of the company's iron mines are also given. There is a well-executed model of the Pioneer furnace at Marquette, probably the best equipped charcoal furnace now in blast. This furnace is 70 ft. high and 12 ft. bosh, and is supplied wtih machinery of the latest type. The charcoal is supplied by 86 charcoal kilns, which are provided with apparatus for saving all the by-products, which are put into marketable form in the chemical works attached to the plant. As an example of the work done at this furnace, the visitor is shown a graphic exhibit of what may be produced from a given amount of wood, iron ore, and limestone used as flux. A log of hard maple, represents in quantity just one-sixteenth of a cord of wood. Its equivalent in charcoal obtained by this process is 55 lb.; the quantities of by-products obtained from this amount of wood are also shown: 13 gal. pyroligneous acid, 0.5 gal. of wood tar, 4 lb. gray acetate of lime, and 0.25 gal. of 95 per cent refined wood alcohol. Reverting again to the 60 lb. of charcoal, if this be used as a fuel to smelt the 120 lb. of Lake ore, and the 30 lb. of Cliffs-Shaft ore shown in mixture, and 4 lb. of limestone as a flux, there will be obtained 78 lb. of charcoal pig iron as represented by the exhibit, and 15 lb. of furnace slag.

The exhibit of the Lower Peninsula includes some coal and a great variety of clay, marl,

lime and other cement materials accompanied by finished cement and concrete. It is well known that the cement industry in this State is a large one and is rapidly growing. These are accompanied by salt from the Saginaw district, with various products of salt, although the chemical works do not make as large a showing as might have been expected. Clays and clay products complete the exhibit.

Minnesota.—The State exhibit, prepared by the Geological Survey, under charge of Mr. Winchell, is a collection showing the structure, modes of occurrence and origin of ore deposits; ornamental and building stones; rocks which produce lime or cement, with their products; clays and products; iron ores from the Mesabi and Vermilion Ranges.

In addition to this, the State shows a large model representing the harbor of Duluth, with shipping docks for ore, coal docks, etc. Unfortunately this is not well placed or arranged, and can be seen only with some difficulty, so that it is not generally appreciated.

The Oliver Iron Company, besides iron ores from the Mesabi and Vermilion ranges, has a model of one end of the great Fayal mine on the Mesabi range. This shows the open-pit workings at the lower end of the mine, and a part of the underground workings. The company also has several models showing ore-docks and ore-cars, and a number of photographs illustrating its operations and the geology of the Mesabi country.

Iron ores, and the iron formation—including the well-known greenstone, jasper and taconite—are shown by Corrigan McKinney & Co., by Pickands, Mather & Co., and by several mines.

Other Minnesota exhibits illustrate the resources of the State in stone and other structural materials. While this State is the largest producer of iron ore in the country, actual mining operations are confined to the small district in the northeastern part, which includes the iron deposits. Outside of this, quarries and clay-pits represent the mineral industry.

Ohio.—The great State of Ohio, though much iron is made within its borders, now mines little iron ore. The once-famous blackband ores of Jackson county are nearly exhausted, and the ores of the Hanging Rock region are now the only ones actively worked. Ohio iron is made chiefly with Lake ores. Still, many specimens of iron ore from different places are shown, while several furnaces send specimens of their products such as car-wheel and other special irons.

The coal industry is represented by specimens from a number of mines, but there is no distinctive exhibit. The Hocking Valley and other districts contribute specimens only.

The pottery interests show clays and some specimens of their work, but do not make the representation that might be expected, as we have heretofore noted. Of clay products—such as refractory, paving and building bricks, tiles, pipe and the like—there is a fair showing. The glass makers contribute also.

The chemical industry of the State has samples of its products, salt, bromine, etc. Cement in various forms is largely made in the State. Slag bricks and slag cement, made at the Brier Hill furnace, near Youngstown, are examples of the utilization of by-products which were formerly wasted.

The special State exhibit includes maps, statistical charts and other information. There is also a large collection of mineral specimens, showing ores, fuel, structural material, salt, bromine and chemical products.

Pennsylvania.—The Pennsylvania exhibit includes a large variety of products, the leading feature naturally being coal. The anthracite companies made a joint exhibit, which not only shows a finished and marketable product as it comes from the breakers, but also illustrates the methods of mining and preparing the coal. The larger part of this exhibit was prepared and presented by the anthracite companies jointly, the credit of inducing them to present this object lesson being due to Mr. Edward W. Parker. The exhibit includes a model, carefully worked out, of a section of an anthracite mine, showing the methods of mining, mine timbering and haulage usually adopted. It is, we believe, a composite section, that is, it is intended as a representation of a typical anthracite mine, features being brought in from different collieries, and is not an exact representation of any one colliery. The use of electric and rope haulage on the main roads, of mule haulage in the side gangways, the customary manner of leaving pillars between chambers, and other interesting points are well shown. In connection are two large models, one showing the rope haulage from a slope mine, and the other the raising of coal from a shaft mine, and the transfer from the mine in both cases to the breaker. The breaker itself is shown in a very complete model, with rolls, screens and all the other appliances. It is probably as complete an illustration of coal-mining methods in the anthracite country as could well be given on a small scale. This special exhibit also includes geological relief maps of the Wyoming, Lehigh and Schuylkill region, and a large number of fine photographs of mines and surface works. A glass model of the Jeddo tunnel completes this very interesting representation.

The bituminous coal-mining companies also make a very excellent showing. Probably the most complete and finest working models in the Mines Building are those shown by the Pittsburg Coal Company. The first of these, arranged in two stages, represents First Pool mine No. 2, owned by the company, which is one of the largest in operation along the Monongahela. The lower stage of this model shows the openings in the mines, the method of running entries, methods of ventilation, pumping, and haulage by mules, by electricity and by compressed air locomotives, the use of mining machines in breaking down the coal, and other points in underground practice. The upper stage shows the surface works, with tipple, rope haulage from the slope, screening and separating house in connection with the tipple, the methods of dumping mine cars and loading the railroad cars, the power and boiler house, repair shops, and finally, a group of miners' dwellings, with school-house and church. The latter are introduced to illustrate the arrangements made by the company at its more important and more recent mines. The whole model is so complete and so well arranged that we present herewith drawings from which it was constructed, showing both stages. Another model exhibit by this company is of a lake dock, showing the method of handling coal and loading vessels at Lake Erie ports with the McMyler unloader, which lifts a car carrying 50 tons of coal and dumps it directly into the vessel's hold. A number of fine photographs and views show the various properties of the company, including the mine tipples, coal ovens and the like, its docks at Lake Erie ports and at the delivery ports on Lake Michigan and Lake Superior. The visitor who studied this representation carefully could not fail to get an excellent idea of the methods adopted in mining, transportation and delivery of bituminous coal; and in addition to this the company distributes a carefully prepared and profusely illustrated pamphlet describing its methods. Did space permit, we should like to quote considerably from this pamphlet.

In this connection it may be said also that Pennsylvania has a share in the large models, which are shown in a separate place, as a general coal exhibit, one of these representing the works of the Somerset Colliery Company, operating in Somerset county, Pa. These models were described in the JOURNAL for April 7 last by Mr. Edward W. Parker, who took a prominent part in their preparation.

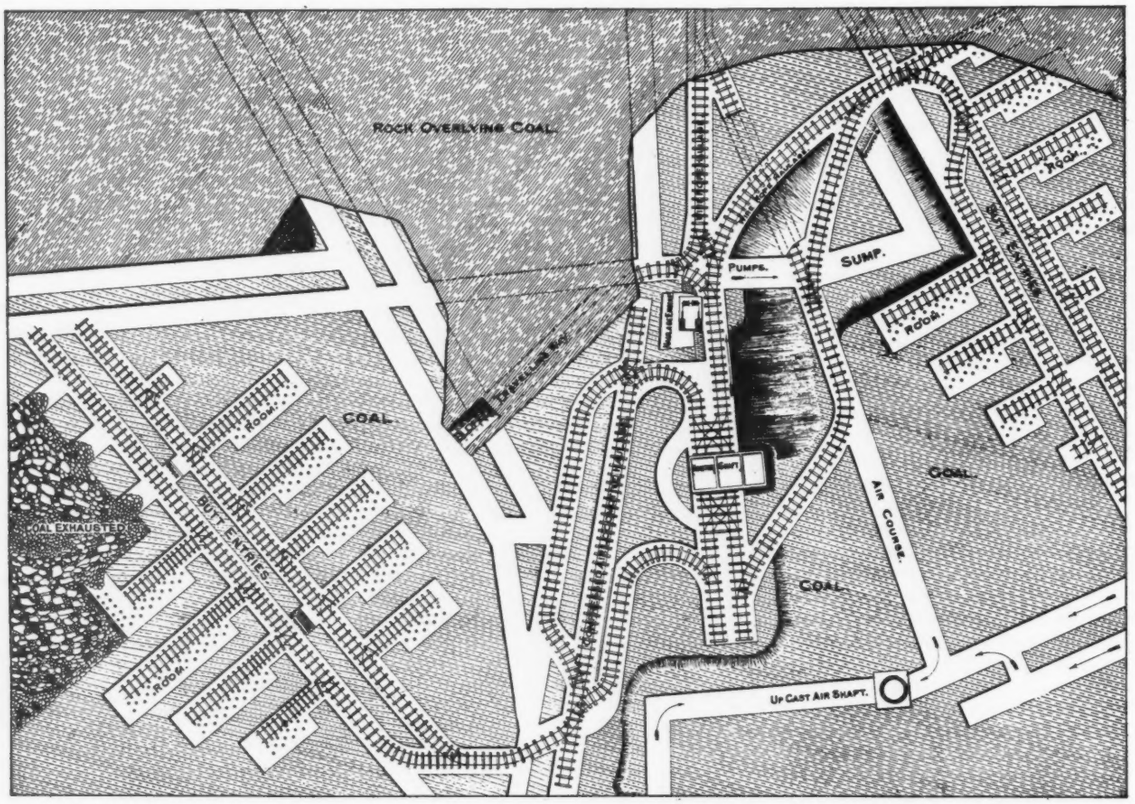
Other Pennsylvania exhibits are of a varied nature. In addition to coal specimens, the State displays building stones, including talc, marble, limestones, sandstone, granite and slate, metallic ores, including iron ore, zinc ore and manganese ore, with a variety of other mineral products, such as graphite, phosphate, paint, clays, feldspar and kaolin. The clay industry also finds a place here. The very important cement industry of Pennsylvania shows cement materials, cement at various points of the process of preparation, the finished cement and concrete.

Some of the slate operators have a special pavilion tastefully constructed of slate, showing the various colors and sizes obtainable both from the Bangor and Peach Bottom regions.

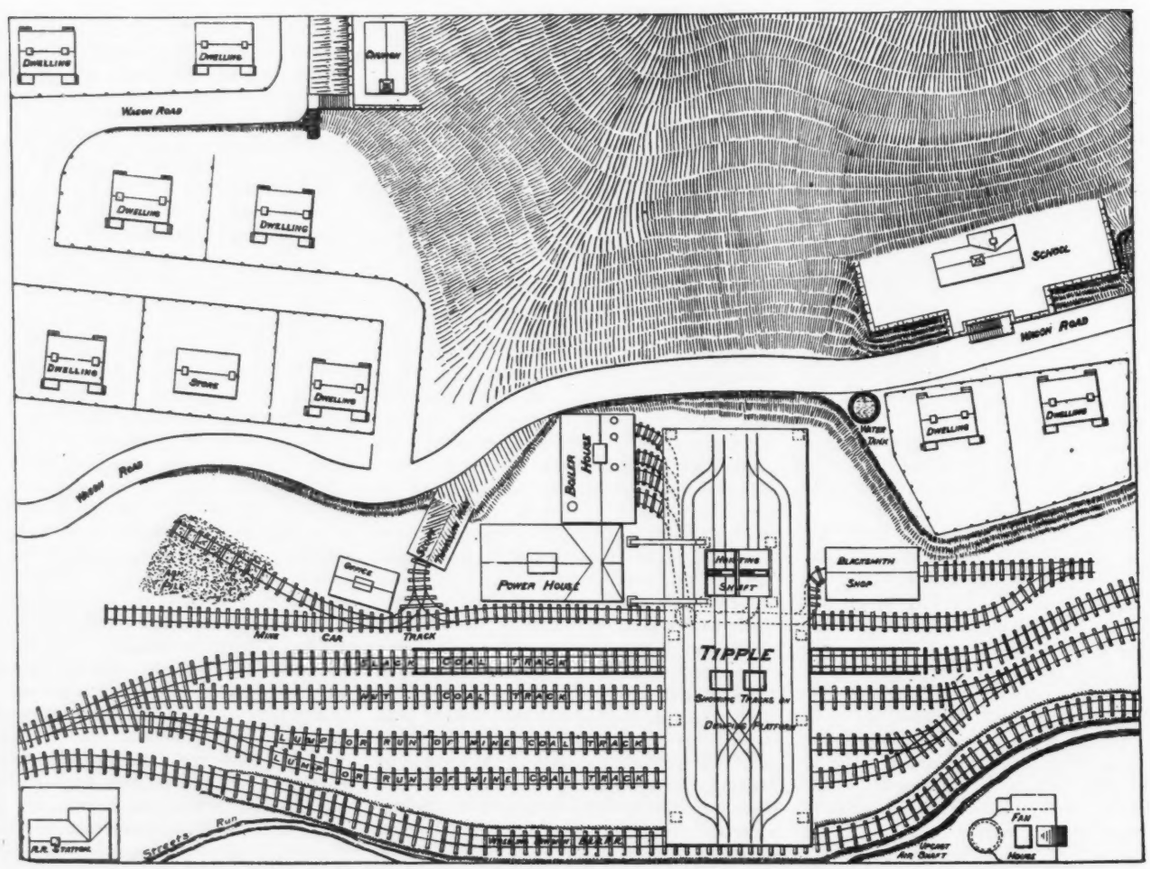
Mention should be made also of the zinc ores of eastern Pennsylvania, and spelter and zinc white from the Palmerton works. The Lehigh Zinc Company also has models of coal and ore tipples, coke ovens and furnaces. Some nickel ores from the old Gap mines are also in the collection. It will be seen that Pennsylvania occupies considerable space, but not more than is in accordance with the importance of its mineral production. The iron industry, however, is mainly shown in outside exhibits made by independent companies, which will be noticed later.

Tennessee.—The Tennessee exhibit in the Mines Building is largely composed of specimens. These include copper ores from the Ducktown district; iron ores from the Cranberry district, the Roane and other mines; zinc ores from various points; barite, fluorspar, clays and paint ores. There is also a large collection from the phosphate district of the State. Some special exhibits are of iron ore and flux, shown together by the Roane Iron Company, ores, matte and copper by the Ducktown Sulphur, Copper & Iron Company, copper ores and products in various stages, such as roasted ore, matte and bessemer bars, by the Tennessee Copper Company, coke from several mines and talc from East Tennessee. On the walls of the exhibit are a large number of photographs, showing mines, furnaces and interesting geological points.

In the Gulch the Ducktown Copper Company has a quantity of ores from the Ducktown district, which, we believe, are to be shown later in process of reduction, but the preparations are not completed.



FIRST POOL MINE NO. 2, PITTSBURG COAL COMPANY—UNDERGROUND WORKINGS.



FIRST POOL MINE NO. 2, PITTSBURG COAL COMPANY—SURFACE WORKS.

Virginia.—The Virginia exhibit, which is prepared by the Agricultural Department of the State, under the charge of Mr. Bates, who is thoroughly familiar with its mineral resources, shows prominently the iron ores of the Valley, with the coal, iron ores and iron of the southwest corner of the State. Zinc ores from the Bertha and other mines are presented also, with the finished metal. Manganese ore from Crimora and pyrite from several mines are included in the collection, while copper ores from the district bordering on the North Carolina line in southern Virginia have their place. Cement and other materials of construction are well represented. There are some fine specimens of asbestos, but with little information as to the quantity obtainable. Among other Virginia minerals shown are gypsum, barytes, kaolin, infusorial earth, feldspar, graphite and mica. A variety of waters from the noted Virginia springs tempt the visitor.

West Virginia.—West Virginia is almost alone in having no distinctive State exhibit, although it is possible that one may be installed later. In the general coal exhibit is a large model of the Fairmont Coal Company, which was described in our issue of April 7, and relief maps of the New River and Kanawha coal-fields, also described in that issue. The Fairmont Company's exhibit is carried out in some detail. It is in three sections and covers a floor space of 3,660 sq. ft. The principal section is that representing a complete coal-mining plant of the Fairmont Coal Company, showing the tipple, washer plant, crushers, elevators, conveyors, revolving screens box-car loaders, bins, coke ovens, coke crusher and graded bins, larry, seven railroad tracks, 20 to 30 railroad cars, boiler house, electric power house, office, superintendent's house, several types of miners' houses, ventilating fan and house, roadways, walks, terraces, rocks, trees, embankments, electric pole lines and, in fact, everything required to make the plant complete and to make the picture a natural one.

In addition to the State exhibits, there are a number in the Mines Building, outside of the special pavilions or divisions, made by companies and individuals. Most of these deserve mention, as they are worthy of attention. The majority belong to the iron and steel manufacturers.

The largest and most striking show of this class is made by the Bethlehem Steel Company, of Bethlehem, Pa. This includes a great deal of heavy work, such as large shafts for engines, marine and stationary, large forgings of other types, armor-plates, and a variety of ordnance works. Guns of various sizes, with shields, carriages and other appurtenances are shown; also a completed and mounted turret for one of the United States battleships. There are projectiles of different types, and armor-plates which have been tested, showing the effect of impact on plates and projectiles. The exhibit brings out in a striking way the large masses of material which must be handled in modern works of this class.

The Carbon Steel Company, of Pittsburg, has an exhibit illustrating the manufacture of nickel-steel plates.

The Empire Iron & Steel Company, of Niles, Ohio, illustrates the use of sheet steel in building work by a large collection.

The Etna Iron Works, of Pittsburg, makes an exhibit showing the methods of manufacturing steel tubes and pipes.

The Ewald Iron Company, of Nashville, Tenn., has a fine collection of bars, rods, staybolts, forgings and other products made of charcoal iron, to which this company adheres, believing it superior to steel for many purposes.

The Glasgow Iron Company, of Pottstown, Pa., and the Worth Brothers Company, of Coatesville, Pa., show fine specimens of rolled steel; some very large plates, flanged and dished plates for boiler work and the like.

The Pittsburg Board of Trade has a special division, intended to show the importance of that city in the coal and iron trades. A relief map, or model, of the Pittsburg district shows the location of mines and works, and there are a large number of photographs, with statistical tables and other information. There are also specimens of the products of local industries of all classes.

The Morgan Construction Company, of Worcester, Mass., has full-sized sets of rolls and other machinery, illustrating the rolling of iron and steel. In connection with this is a full-sized section of a Foster gas-producer, showing the action of the coal in the producer when in operation.

A special pavilion has been put up by the International Nickel Company, in which are nickel ores, nickel matte, refined metal and specimens of nickel-plating; nickel alloys, with tubes, plates and other articles of nickel-steel.

The Lanyon Zinc Company, of St. Louis, has also a pavilion of its own, which not only shows numerous specimens of spelter, but also many finished products, some of them suggesting extended uses for the metal in the way of roofing and other construction, and of ornamentation.

The Niagara Falls Board of Trade has a joint exhibit showing the products of the important electric and electro-chemical industries which are now concentrated at and near that town, and which derive their power from the Falls. It is rather an impressive one, and shows some new industries which have grown up there, and some new applications of electricity.

In this connection we might mention the exhibit of the International Acheson Graphite Company, which is, however, separately made, in the Electricity Building. It is a collection of artificial graphite in various forms, electrodes being the more prominent; and shows an entirely new product and industry, based upon abundant electric power. For certain purposes the artificial graphite is superior to the natural product, and is rapidly taking its place.

Among what might be called the side-shows are two, both in the Gulch section, which are worth seeing. One is the Anthracite Mine, through which the visitor is carried in a mine car, giving one really the feeling of descent to a great depth. On the way he sees some striking pictures of mine operations, and the whole arrangement is realistic to a degree.

The other is a group of Mexican miners from the mountains of Sonora, who are at work concentrating, smelting and refining copper in the primitive ways pursued by their forefathers for many generations.

Mr. Neil Roberts, of Charleston, W. Va., representing the West Virginia coal exhibit, is erecting a statistical column in the Mines and Metallurgy Building in the central section, which will consist of cubes placed one on top of the other showing the production of coal in the United States up to and including 1903. This column will be 18 ft. high, commencing with a cube 4½ ft. square.

There are many points in the Exposition, on which we hope to enlarge hereafter. The necessary limitations of space have compelled the writer not only to condense the descriptions, but also to postpone to a future number all description of the foreign exhibits, some of which—notably in the case of Japan—have much interest.

For the same reasons only brief mention can be made of the well-ordered display of the Geological Survey in the Government Building. The quarters reserved for the Survey in the Mines Building are at present occupied only by a few charts and diagrams. A more extended display is to be made there, it is understood. It is difficult to understand why the completion of this exhibit has been so long delayed.

We may add here that the Association of Portland Cement Manufacturers has a large building under construction in reinforced concrete. The beginning of this structure was purposely postponed until after the Exposition was opened, the methods used in its construction being part of the exhibit, quite as much, if not more, than the building itself.

We have said comparatively little about the Gulch—the outdoor part of the Mines Section—owing to its unfinished condition, but hope to make up for this later.

We postpone also detailed mention of the exhibit made by the Philippine Commission, which includes a presentation of what is known concerning the mineral resources of the islands.

The machinery exhibits, which are an important and interesting element in the mines display, are not all to be found in one building. They are in the Mines Building itself; in the Gulch; in the Machinery Building; in the annex to that department, called officially the Steam, Gas and Fuels Building; in the Electricity Building; with a few in the Transportation Building. The Machinery Building was the most backward of any on the grounds, and there was still much to be done there in the middle of June. The Steam, Gas and Fuels Building—which we shall call the Steam Building for convenience—is the working department, in which are the boilers and their appurtenances, the gas-producers and all the apparatus—except the engines—which furnish power and light to all the buildings and machinery in the Exposition. Here are made also tests of fuel, of methods of firing and other details connected with the power. It is, therefore, a business building rather than a show place; and though open to sightseers, it naturally attracts only those who are specially interested in its workings.

Here, again, the limitations of space compel us to cut down the accounts of the machinery exhibits to the lowest limits, hardly more than a brief mention. More extended descriptions may be given hereafter; but it must be remembered that the present purpose is to give only a general view, or an outline of what our readers may expect to see. A complete description of one department alone of the great Exposition would fill several issues of the JOURNAL. We give, therefore, the following brief notes:

The Solvay Process Company, in addition to

its chemical exhibit in the New York pavilion, has a special group, showing the methods adopted and results gained from the conversion of coal into coke in Semet-Solvay retort ovens; also the chemical treatment of various residues.

The United Coke & Gas Company, of New York, has an exhibit illustrating the manufacture of coke and the saving of by-products in retort coke-ovens. Specimens of tar, oils, ammonium sulphate, etc., in connection with the coal used and the coke made indicate some of the economies of the processes used by the company.

The Weimer Machine Works, of Lebanon, Pa., have a slag-car, wholly of iron and steel construction. It has two four-wheel trucks of steel. The slag-pot is carried on trunnions, supported by a steel frame, and is tipped and dumped by a cylinder, in which either steam or compressed air can be used. At the opposite end of the car is a retarding cylinder, filled with oil, which prevents too rapid motion of the slag-pot, and prevents any accidental or premature dumping.

The Keuffel & Esser Company, of New York, has a case of surveying and office instruments, with a patent board, or drafting table, and other appliances, which interest mine surveyors and map-makers.

Eimer & Amend, of New York, have a carefully prepared exhibit of radium salts and radio-active minerals.

Mine-surveying instruments are shown by W. & L. E. Gurley, of Troy, N. Y.

Queen & Company, of Philadelphia, show an assortment of electrical measuring instruments.

The Richardson Scale Company, of New York, has examples of its special manufactures on exhibition in the Machinery Building.

The F. W. Braun Company, of Los Angeles, Cal., has a well-arranged and attractive exhibit, including almost everything that can be needed in the assay office and laboratory. The arrangements for using liquid fuel in the various branches of assay work are especially notable. A number of different forms of laboratory crushers, breakers, grinding rolls and sampling machines are so arranged that they can be fully inspected, and can also be seen at work on ore. In fact, everything is shown to the best advantage.

The Denver Fire-clay Company has at present a small exhibit in the Colorado pavilion. It is arranging a much larger one of the varied products in which it deals, in the Metal Pavilion, which is not yet ready.

The American Concentrator Company, of Joplin, Mo., has already been mentioned, in connection with the Missouri State exhibit. In addition it has, in the Mines Building corridor, a complete ore-dressing and separating plant and coal-screening plant. It will also have machinery at work in the Gulch.

The Allis-Chalmers Company's exhibit in the Mines Building is a large one. It includes a stamp-mill, Huntington mills, several types of crushing rolls, a steam stamp, vanners, Overstrom concentrating table, a complete cyanide plant and hoisting engines. It has mining machinery, in fact, of almost every kind requisite for the operation of a mine and mill.

The Crawford & McCrimmon Company, of Brazil, Ind., has hoisting engines and fan erected in the Gulch, showing its special types of construction. In addition, it has in the corridor a hoisting engine of its construction, which has seen long and hard service at a coal mine, but is still in good working order.

The Williams Patent Crusher & Pulverizer Company, of St. Louis, has its machines on exhibition, and will soon have at least one in operation.

The Austin Manufacturing Company, of Chicago, has a large exhibit, prominent in which are a number of gyratory crushers of various sizes. Besides these, there is found contractors' machinery of almost every kind; dumping wagons, scrapers, excavators, screens and other forms. All sorts of machines for handling gravel, overburden of all kinds and similar work can be found.

Owing to the situation of the Exposition on high ground, the water for the lagoon and the cascades is not a natural supply, but is Mississippi water brought from the river. To keep up a constant flow would be too great a draft upon the water-works; while, naturally, it would not do to allow the water to become stagnant. Under the system adopted the lagoon is drawn off and refilled four times in each 24 hours, the water being aerated and freshened during this process, so that it can be used again. The large pipes through which it passes were furnished by the American Spiral Pipe Company, of Chicago.

Besides steam pumps and pumping engines in the Machinery Building, Henry R. Worthington (incorporated) has boiler feed and circulating pumps in the Steam Building. These works also furnish the large pumps elevating the water from the lagoon running through the center of the grounds to the Cascades, which are a prominent decorative feature of the Exposition. The work required there is heavy, as the volume of water used is large.

The A. S. Cameron Steam Pump Company, of New York, has steam pumps of the well known Cameron type in the Machinery Building and the Steam Building.

Jeanesville pumps are well known to both coal and metal miners. A fair representation of various types is made by the Jeanesville Iron Works, of Jeanesville, Pa., in the Exposition.

The Morris Machine Works, of Baldwinsville, N. Y., exhibits centrifugal pumps, of which a specialty is made by these works. These include pumps with special lining, for use in cyanide plants and other places where some precaution of this kind is needed.

A 30 brake horse-power De Laval steam turbine, low pressure, centrifugal pump, with capacity of 3,000 gals. per minute and a total lift of 22 ft., is being installed in Block 13, Mines and Metallurgy Building St. Louis.

The Watt Mining Car Wheel Company, of Barnesville, Ohio, has an excellent exhibit. Besides wheels and axles so arranged as to show the special features of their construction, there are a number of mine cars of different sizes and of both wood and steel construction. These wheels are in extensive use, and have done excellent service in many mines. The exhibit is in a central position, and receives much attention. The company will have several cars at work in the Gulch.

The Hockensmith Wheel & Mine Car Company, of Penn Station, Pa., shows several types of wheels and axles for mine cars.

The Broderick & Bascom Rope Company, of St. Louis, has exhibits of ropes and their applications in hoisting and transmitting power both in the Mines and the Machinery buildings. It has also a tramway under erecton in the Gulch.

The Leschen & Sons Rope Company, of St. Louis, has a fine exhibit of its wire rope and fittings, and will also have a tramway in operation outside in the Gulch.

The Brown Hoisting Machinery Company shows hoisting and conveying machinery, with photographs and other illustrations of large installations, which could not be brought into the space allowed in the Exposition.

The Chrome Steel Works, of Brooklyn, N. Y., present some fine stamp-shoes, dies and steel castings for mining machinery, made of the special steel alloys for which the company is noted.

The Taylor Iron Company, of High Bridge, N. J., has an excellent exhibit, showing the application of manganese steel to mining machines. It includes shoes, dies and other steel forgings and castings; a large circular screen of the type used for ores, coal, cement, etc.; a section of Hadfield's Heclon rock-breaker, with manganese steel wearing parts; mine car wheels and other specialties.

The Westinghouse Machine Company has, as a part of the power equipment of the Machinery Building, several gas engines of 1,500 and 2,000 h. p., the largest yet built in this country. They are of the vertical type. There are also several steam engines of the well-known Westinghouse pattern.

The Stroudsburg Machine Works, of Stroudsburg, Pa., shows excellent specimens of the work turned out from its shops.

The Weber Gas & Gasoline Engine Company attracts much attention in the Machinery Building by its collection of gas and gasoline engines of various sizes. In addition to this the company has, in the Steam Building, a complete power plant, including gas producer and engine, from which some remarkable results have been obtained. The producer is adapted to use wood or charcoal, and the plant is so compact and easily transported that it seems especially adapted for use in mines to which access is difficult; while its economy and the small space occupied will recommend it everywhere. We hope to describe this plant fully at an early date.

The Foos Gas Engine Company has a selection of the special type of gas engines which it manufactures in the Machinery Building. There are a number of engines of different sizes and patterns, making a comprehensive exhibit.

The Lidgerwood Company, of New York, has a collection of hoisting engines, quarry machinery and its other specialties in handling material. It is complete of its kind, and shows the wide range of work now done by this class of machines. In addition to this, the company will have some engines in operation in connection with the working mine exhibit in the Gulch.

The Otto Gas Engine Works, of Philadelphia, has a number of its engines, of different sizes, in the Machinery Building. Like all the gas engines, these receive much attention, and serve to show visitors the convenience and value of this type of motor.

The Harrisburg Foundry & Machine Works, of Harrisburg, Pa., shows excellent examples of its engines in the Machinery Building, where they are under comparison with the work on other builders. They stand the comparison well, judging by the attention paid them.

In addition to the exhibit in the Mines Building the Allis-Chalmers Company occupies a central position in the Machinery Building with a compound engine of the Corliss type, rated at 5,000 h.p. This engine is of massive construction, one cylinder horizontal and one vertical, and is the largest single engine shown. There are several smaller engines also.

The Consolidated Engine Stop Company, of New York, shows its invention applied in various ways, to engines of different types, illustrating its importance and utility very clearly.

Air compressors are exhibited by the Laidlaw-Dunn-Gordon Company, of Cincinnati. This company furnished the compressors for the central plant from which compressed air is distributed to the various sections of the Exposition, where it is utilized. These air compressors were illustrated and described in this JOURNAL, January 28 last, page 164.

The J. G. Leyner Engineering Works Company, of Denver, Colo., has a working exhibit in the Mines Building, almost the only one now in operation. The exhibit is well arranged, and includes a steam-actuated air compressor of large size, a hoisting engine and sections of a drill, so arranged as to show the construction of the machine very completely. The working section consists of a belt-driven air compressor, at present receiving power from an electric motor, and a drill set up on its tripod in front of a large block of very hard Missouri granite, which affords an exacting test of its powers. This drill is run at intervals during the day, showing its operation and the results secured.

The Gardner Electric Drill & Machinery Company shows the Adams drill, which is a recent device of the percussion type. It is claimed that in its design some of the objections made to earlier types of electric drills have been obviated, and that its action is very satisfactory.

The American Diamond Rock Drill Company, of New York, has a complete drill outfit in the corridor of the Mines Building. It will also have one in operation in the Gulch very soon.

Howell's Mining Drill Company, of Plymouth, Pa., has coal-drills on exhibition in the corridor of the Mines Building, which may be put at work later.

The Wood Drill Works, of Paterson, N. J., has drills of its make in the corridor of the Mines Building, where a number of the larger machines are placed. Later one or more of these drills will be shown at work.

The "Little Wonder" air-hammer rock drill, made by Martin Hardsocg, of Ottumwa, Iowa, is an exhibit of a very useful invention, which we hope to describe more in detail later.

The Denver Engineering Works, of Denver, Colo., shows its type of electric rock drill, which is placed not in the Mines but in the Electricity Building.

The Jackson Electric Drill & Supply Company, of Denver, Colo., shows its type of drill in the corridor.

An electric rock drill is shown in the corridor by the Locke Drill Company, of New York.

The Bullock Electric Manufacturing Company has a large exhibit, including motors and applications of the same to mining and other machinery.

The General Electric Company's exhibit is a very large one, covering nearly every branch of electric work. Mining men are interested in the motors, electric locomotives and similar work. A full description of these exhibits is impossible.

The Crocker-Wheeler Company, of Ampere, N. J., shows a varied collection of motors and electrical appliances of all sorts.

The Westinghouse Electric & Manufacturing Company, of Pittsburg, has, as might be expected, motors, generators and electrical machinery of almost every kind. Its exhibit is one requiring time and careful study to be appreciated.

The National Electric Company, of Milwaukee, Wis., has motors and various types of electrical machinery, making an extensive exhibit.

The Northern Electrical Manufacturing Company, of Madison, Wis., has exhibits both in the Electricity and Machinery buildings. The former includes almost every kind of electric machinery and motors.

The Morgan Electric Machine Company, of East Chicago, will have one of its electric locomotives in operation in the Gulch shortly.

A practical exhibit is that of the C. W. Hunt Company, which shows an electric storage-battery locomotive operating on a Hunt industrial railway laid in the court of the Electricity Building. The track extends round the circumference of the court, and attached to the locomotive are two shop cars. Seats have been placed on the flat top of each car, and these are being utilized to carry interested visitors, while the operator describes in detail the purposes and mechanism of the locomotive and railway. In the loggia of the court the same firm exhibits a straight-line electric hoist, together with photographs of plants which have been equipped with its coal-handling machinery.

The Link-Belt Machinery Company has an installation in the Machinery Building, showing methods of conveying and construction. It is also putting up a working exhibit in the Gulch, which will be seen transferring ore in that section of the ground.

The American Locomotive Company's exhibit in the Transportation Building includes chiefly locomotives of the heavier types, and of the most recent construction.

The Baldwin Locomotive Works, of Philadelphia, besides its fine exhibit of large locomotives in the Transportation Building, has several electric locomotives, for general and for mining purposes. The mining locomotives are of the well-known Baldwin type, which is extensively used in Western Pennsylvania coal mines and elsewhere.

The Trenton Iron Company, of Trenton, N. J., has a model showing the operation of a Bleichert tramway very completely. It will also have some machinery in the Gulch sections.

The Robins Belt Conveying Company, of New York, is installing a belt conveyor for carrying ores in the Gulch, besides its exhibit in the Mines Building.

The Yale & Towne Manufacturing Company, of Stamford, Conn., among its other products, has a collection of hoisting blocks and chain hoists of its triplex, duplex and differential types. Each block is supplied with a weight of 1,000 lb., and arranged so that equal power is applied to each. In this way the different actions of the three types and their relative speeds are shown. A prominent feature is the new electric hoist designed by the company, which is the outcome of long experience in this class of work. It is an efficient machine, easily portable and adapted for hard work under difficult conditions, while it is simple and will bear the rough usage which such machines have to undergo.

The American Well Works, of Aurora, Ill., has some of its well drilling machinery in the corridor of the Mines Building. These machines were not working at the time when this is written, but in the present month they will be in full operation in the Gulch.

The Keystone Driller Company, of Beaver Falls, Pa., has an outfit in the Mines Building; also one in the Gulch, which is ready to go to work as soon as arrangements for power are completed.

The Harrison Safety Boiler Works, of Philadelphia, has an important working exhibit in the Steam Building, in the boilers supplying a large part of the steam used in generating power. These boilers are of large size and in daily use, furnishing a severe test of their capacity and economy. Like all the apparatus in this building, they are under close and constant observation.

The Lombard Governor Company, of Boston, shows types of its device for regulating water wheels and the applications of this invention, with full information as to results.

The Shultz Belting Company, of St. Louis, has a fine display of belting for machines of all classes, with a showing of tests, results of wear and the like.

The Crane Company, of Chicago, takes up a large space in the Machinery Building with a varied exhibit of valves, pipe and machine fittings of all kinds and similar work. Besides the finished articles, the manner of making and fitting is illustrated. It is one of the most instructive exhibits of the kind.

The Lunkenheimer Company, of Cincinnati, Ohio, has a handsomely arranged pavilion in the Machinery Building, with a great variety of brass work in the form of valves, lubricators' gauges, engine and boiler attachments of all kinds and the specialties for which the company is well known.

The Crosley Steam Gauge & Valve Company, of Boston, shows gauges and other attachments for boilers, of fine workmanship. Valves of all kinds and sizes are included.

The Burt Manufacturing Company, of Akron, Ohio, shows in the Machinery Building an excellent selection of its oil-separators and other appliances and attachments for engines and machinery.

The American Steam Gauge & Valve Company, of Boston, has a well-arranged display of its gauges and other appliances in the Machinery Building.

The Archer Iron Works, of Chicago, show mine cars, car wheels and axles, charging barrows for coal, coke and ores, and barrows of special types, all of steel and iron construction.

The Whiting Foundry Equipment Company, of Harvey, Ill., is supplying equipment to the model foundry in the Gulch, and also equipment in the Metal Pavilion. These will soon be in operation.

Gas producers of the Taylor type, made by R. D. Wood & Company, of Philadelphia, are in course of erection in the Gulch. They will be in operation in connection with the model foundry building, and will also be used in the coal tests, to which reference has heretofore been made. This company also has apparatus at work in the Steam Building, where power is generated for the Fair.

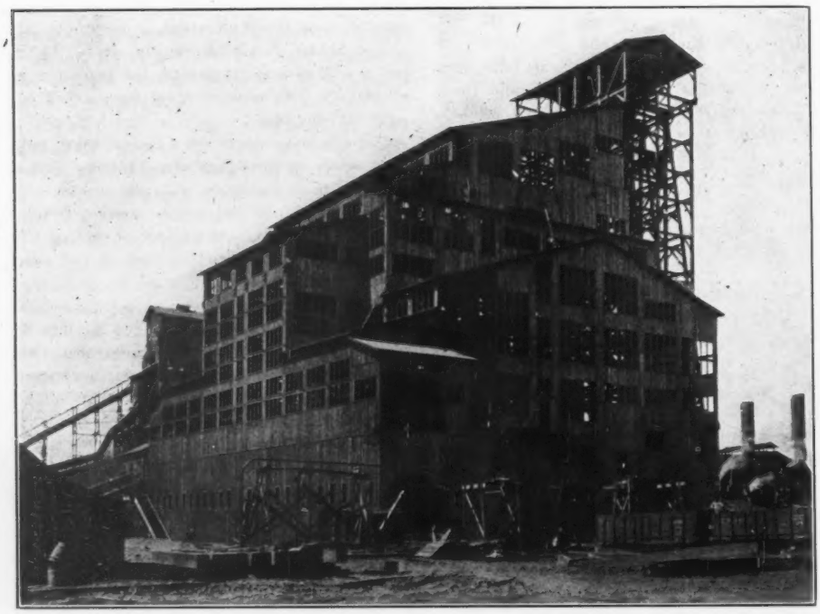
The Laclede Firebrick Manufacturing Company, of St. Louis, has a large exhibit of its products. The works of this company are not far from the Exposition grounds, and visitors are invited to inspect them, many accepting the invitation.

THE NOTTINGHAM BREAKER.

EDITORIAL CORRESPONDENCE.

The old Nottingham shaft at Plymouth, Pa., has two hoisting compartments, and is famous as having held for many years the record for hoisting coal by a cage carrying one car. The shaft is 365 ft. deep, and from surface to the landing in the breaker tower, which is directly over the shaft, is 104 ft., making the total hoist 469 ft. A direct motion 22 by 48 in. Dickson hoisting engine, with conical drums 7 and 9 ft. in diameter, will hoist a loaded cage in 15 sec., and has hoisted 1,313 cars in 10 hours, each car holding about 3 tons.

The old breaker has now outlived its usefulness, and the company is erecting a new one near by, which will take all the coal from the old Nottingham shaft and from the Reynolds No. 16 also. The Nottingham workings are extensive, and the coal is now hauled underground a longest distance of about two miles. Air locomotives are being installed and air will be supplied by large three-stage compressors. The new breaker will be one of the largest in the anthracite region, and is briefly described here since it represents the ideas of a company that is conservative in its engineering practice, yet ready to adopt what in its judgment is best suited for conditions at its mines.



NOTTINGHAM BREAKER.

The building is of wood, the iron used in its construction being limited to some 200 timber brackets for the trees, carrying the weight of rolls, screens, conveyors, etc. The building is 152 ft. across the dry coal lips, 128 across the wet, 176 ft. deep to the back tower braces and 169 ft. tall. The timbering is of the continuous column type, the main posts being of two 7 by 14-in. Georgia pine sticks, making columns 14 in. square; other columns are 10 by 10 in. Horizontal members are 10 by 10 in and 12 by 12 in. The columns that bear the heavy rolls are built up to 24 by 14 in., with cross members 20 by 12 in. The columns parallel with the front are spaced with 12-ft. centers. All timbering has mortice and tenon joints. The boarding for the sides is of Pennsylvania pine, 1 in. thick, with weather strips, and Warren-Ehret slag roofing will be used on the roof. The volume of the building is 1,756,000 cu. ft., and it will contain 1,500,000 ft. of lumber.

Power for this breaker and for other purposes will be furnished by a new boiler plant in a boiler-house 45 ft. by 125 ft., with concrete and masonry foundations. Four batteries of Babcock & Wilcox boilers, with a combined capacity of 2,000 h. p., are being installed. Forced draft will be by a Sturtevant 9 ft. by 4.5-ft. steel plate fan, driven by a Sturtevant engine and connected with the ash pits by a brick flue. The boilers will have also brick flues leading to iron stacks, while ashes will be removed by a car running on a track below the floor of the boiler-house.

The breaker will have a nominal capacity of about 3,500 tons of prepared coal in nine hours, though it is probable that when everything is in working order, and there is a good demand for coal, this output will be considerably exceeded. The building is what is known as a double breaker; that is, the equipment is in duplicate, and either side may be operated independently of the other. Either side also will handle wet and dry coal, the equipment in the front handling dry coal, and that in the rear wet coal. The coal will be hoisted in self-dumping cages. Two traveling iron picking tables of regulation pattern, one on either side, will take the coal from the cages, and there will be nine pairs of rolls for reducing it to the different sizes. The large crushing rolls at the top of the breaker will be 32 in. in diameter by 48 in. long, and the smallest rolls will be 24 in. in diameter and 30 in. long. All rolls will have removable steel teeth. The screens for sorting the sizes and cleaning the coal will be both shaking and revolving. There will be four revolving double-jacketed screens (wire jackets) on each side, 6 and 8 ft. in diameter, and 18 and 21 ft. long; two long screens, 6 ft. by 30 ft. and 8 ft. by 12 ft., and five 6-ft by 12-ft. single screens, making 11 revolving screens in all. The four double 6 and 8-ft. screens have 15-in. pipe shafts and the 6 by 30-ft. screens will have 19-in. pipe shafts. The shaking screens are of perforated metal, and will be used on the wet side of the breaker for preparing stove size and smaller, and on the dry side for preparing pea size and smaller. The large conveyors will use drop-forged chains of the regular Lehigh & Wilkes-Barre round head pattern. The Ewart chain made by the Link Belt Engineering Company will be used for the small conveyors. The pins and attachments on the drop-forged chains are standardized so that they can be used interchangeably.

There will be six nests of quadruple discharge jigs, making really 24 jigs in all. These jigs will be of the Philadelphia & Reading type, with elevator discharge for the coal, but instead of having the regular slush-box discharge for the slate, there will be a conveyor discharge, this improvement being suggested by Mr. Douglas Bunting, the chief engineer of the company.

The elevators, conveyors and jigs and some of the small rolls will be rope driven, by 1.5 in. manila rope on the American system. The large rolls, screens and a Williams pulverizer, for grinding up slate that it may be flushed into old workings, will be belt driven. Power will be furnished by a pair of plain slide valve 16 by 24-in. engines and by a 16 by 20-in. engine for the jigs. The tower hoist is operated by a geared engine with 18 in. by 30 in. cylinders. Water for the jigs and for the wet side of the breaker will be supplied by a 12 and 18 by 14 by 18 duplex inside connected Jeanesville pump. The engines and revolving screens were made by the Vulcan Iron Works, of Wilkes-Barre.

To reduce to a minimum the amount of dust about the building, the Lehigh & Wilkes-Barre Company is preparing to install a system of exhaust fans with separate air ducts leading to the casings of the crushers and to the screen chutes. The dust laden air will be led to a tower and there made to pass through a shower of water.

Work on the building began in June, 1903, and coal will probably be run through it in September next.

GEOLOGICAL SURVEY WORK IN CALIFORNIA AND NEVADA.—The United States Geological Survey will have several parties working in California this season. The areal geology of the Redding quadrangle will be revised by Mr. J. S. Diller, who will also complete an areal and economic survey of the Indian valley quadrangle. Mr. Arthur C. Spencer will co-operate with Mr. Waldemar Lindgren in making an investigation of the economic geology of the Redding quadrangle. An areal and economic survey of the Tejon quadrangle, in southern California, will be made by Mr. George H. Eldridge, who will also make necessary reconnaissance examinations of regions adjacent. The areal and economic survey of the Santa Cruz quadrangle will be completed by Dr. J. F. Newsom, who will be assisted by Dr. Ralph Arnold. Dr. G. K. Gilbert will continue his investigations of the glaciology and physiography of the High Sierras.

Mr. J. E. Spurr will visit the Tonopah district, Nevada, during the summer for final revision of his conclusions before publishing a report on the Tonopah ore deposits.

Java supplies a unique mineral product in the form of iodide of copper, which is produced from the salts contained in natural springs.

THE CUSTOM SMELTING INDUSTRY IN MEXICO.

BY JAS. W. MALCOLMSON.

The rapid growth and development of the silver-lead smelting industry in the Republic of Mexico was due primarily to the Windom decision in 1892 imposing a duty of one and one-half cents per pound on lead in ores imported from Mexico into the United States. The result of this decision was that over $35,000,000 has been invested in silver-lead smelting enterprises in Mexico and large profits have been made ever since; incidentally, it might be mentioned that treatment rates on silicious ores in Colorado went up $1 to $2 per ton on account of the reduction in the supply of lead coming there from Mexico.

Before the custom smelters were established in Mexico in 1891-2, the larger proportion of the ore was treated more or less unsatisfactorily by local methods at the points of production, but to-day most of it is shipped to the smelters. Between 80 and 90 per cent of the entire silver and gold production of Mexico is found in silicious ores and it is in the purchase of these ores that the greater part of the profit is usually obtained in custom smelting.

At the present time all custom smelters are operated at their full capacity and new furnaces are being erected, but the development of the silicious gold-silver mining industry has gone far ahead of the available furnace capacity. Ores containing the precious metals in association with lead, lime and iron or manganese are scarce, and as they usually contain little gold or silver, it is never possible to impose a high treatment charge even when there is a scarcity of silica. Better prices are being paid to-day to the miners of lead ores and of lime and iron fluxing ores than ever before. The demand for such ores is far in excess of the supply; barren iron is shipped to the smelters from the deposits of ironstone at Durango, Monterey, and Jalisco, while limestone is quarried in the vicinity of the smelting plants.

Treatment rates on silicious ores have been raised to such a degree that many mines have been shut down and prospecting is now at a low ebb.

The condition of the lead mines in Mexico to-day is causing the custom smelters considerable anxiety and many thousands of dollars are being spent by their mining departments annually in the search for lead or silver-lead ores. Every inducement is given to the independent producer to mine these ores, and treatment rates are very low; but the lead shortage appears to be permanent. Throughout northeastern Mexico, in Nuevo Leon, Coahuila and Chihuahua, the lead mines are gradually becoming less productive in depth or they are changing into a leady zinc ore, sometimes in the form of carbonate and sometimes sulphide. It seems quite impossible to separate zinc from lead carbonates, and, although a large amount of money has already been spent on magnetic and wet methods of separation of the closely grained lead and zinc sulphides, the results obtained so far have not given any satisfactory return on the investment. In magnetic separation the first cost of the plant is extremely high and the daily output so limited that it is not profitable to separate lead from zinc sulphides low in gold and silver values. On account of the chronic shortage of lead ore and the unsatisfactory character of the lead ores now being mined one of the leading smelting companies has definitely abandoned, at Aguascalientes, the use of lead as a base or collector of the gold and silver contents of the smelter charge, substituting copper matte for that purpose.

The advantages which copper matte has over lead as a vehicle for the concentration of the gold and silver contained in silicious ores are numerous.

1. A lead furnace of standard size will smelt from 100 to 150 tons of charge (ore and fluxes) daily. The same furnace, when altered and operated as a copper furnace, producing copper matte, will smelt from 200 to 300 tons of charge per day, thus doubling the capacity of the plant with practically the same investment in construction.

2. A lead furnace must necessarily run at a low temperature to prevent metallurgical losses, the slag must be more fusible and more carefully regulated than in a copper furnace. A typical lead furnace slag will contain 34 per cent silica, 21 per cent iron (FeO.), 23 per cent lime. A copper matte furnace is operated at a higher temperature than a lead furnace and less attention is necessary in forming the slag; the iron and lime percentages may be altered within wide limits according to the ore supply and the furnace charge may carry as high as 50 per cent silica. In custom work it is desirable to carry as much silica and as little iron on the charge as possible on account of the condition of the ore-supply. A high percentage of lime also makes a light slag which separates rapidly and thoroughly from the heavier matte carrying the silver and gold.

A modern copper matte furnace slag will contain 45 per cent silica; 15 per cent iron; 28 per cent lime. In other words, in a lead furnace smelting 125 tons of charge with 34 per cent silica in 24 hours, 42.5 tons of silica will pass through the furnace, while with copper matte, smelting 250 tons charge per day containing 45 per cent silica, 112.5 tons, or nearly three times as much silica can be handled in the same time.

3. Sulphur in ores smelted in lead furnaces must be got rid of by preliminary roasting at an increased cost of $2 to $3.50 United States currency per ton; in matte furnaces this sulphur is utilized in the copper-iron matte produced, the cost of roasting is eliminated and with an excess of sulphur, as there usually is, the coke consumption is reduced, part of the sulphur being utilized as fuel.

4. Copper matte is a more efficient collector of the precious metals than lead, and copper can be enriched with gold and silver to a much greater degree than lead, without loss. Silver lead bullion is usually exported from Mexico containing 10 kilograms silver and gold per metric ton; copper bullion can be enriched safely to contain 20 kilograms of silver per ton, and therefore only one-half the amount of copper is required to the ton of charge.

The increase in the production of copper in Mexico is noticeable. In the year 1850, the production of the entire globe was estimated at 30,000 tons; in 1891 the production of Mexico was 900 tons; in 1903 it was 48,000 tons, equal to one-fifth the output of the United States.

Of the 1903 production of Mexican copper, 35,000 tons came from northern Sonora. The copper from Sonora, like the lead from the northeastern part of the republic, carries very little gold or silver. The copper exists as sulphide which is concentrated and reduced in blast furnaces to matte. The matte is bessemerized without enrichment and the bullion assaying 99 per cent copper with very low gold or silver contents is shipped to the refineries of New Jersey. Mr. James Douglas in an article[1] on Arizona copper mines mentioned that the new Copper Queen works at Douglas, on the Mexican frontier, were being designed to take custom ores of copper, gold and silver, and added that "though there is no intention of invading the market for lead, it is the intention of the Phelps-Dodge Company to enrich the copper bullion with gold and silver," hoping to secure ores from Mexico.

It is not possible, however, for the Nacozari, Cananea or Douglas smelters in or near Sonora, to reach the silicious gold and silver ores of Mexico which are so badly in need of smelter facilities. These ores are not in northern Sonora but are found at Parral, Guanajuato, Pachuca, Zacatecas, Catorce, Durango and Oaxaca on the central plateau of Mexico, and it is inevitable that the Sonora iron-copper mattes instead of being bessemerized and shipped as at present by way of El Paso, Texas, overland to New Jersey, will in the future be shipped to railroad centers in the central portion of Mexico, and there used as a collector of gold and silver, when they will resume their journey via Tampico by sea to New Jersey.

While the recent announcement of the intention of the American Smelting and Refining Company, the owners of the copper smelter at Aguascalientes, to secure control of the Cananea Consolidated copper mines in Sonora, is probably premature, it is an indication of the desire of that company to control a supply of copper sulphide, and when it is remembered that last year the Aguascalientes smelter made a greater profit than all the smelters in Colorado put together the importance of permanent control of copper sulphides as a base for operations, whether in the shape of high grade ore, concentrates or matte, will be appreciated.

In view of the fact that it is desirable to change the present transport of Sonora copper so that it will pass the silicious centers of the Mexican republic on its way to the eastern refineries of the United States, the government has under consideration a tax on the exportation of copper bullion without precious metal values and on ores or concentrates high in copper only, which will be removed after the copper is enriched before final exportation.

Probably the movement of copper mattes from Sonora and southern Arizona to the gold and silver districts of Mexico, will finally take place in any event, and the present unsatisfactory gold and silver situation will be relieved permanently, but the contemplated action of the Mexican federal authorities, which is in line with the policy of the United States, will materially hasten the change. At the present time the movement is just commencing and profits on silver-gold custom smelting operations using copper as a collector, instead of lead, will probably be large for some years.

The report on the worm disease of the Cornish miners shows that 74 per cent of those who died, aged 40 years and over, were tubercular. In three years 133 miners have died from phthisis in the Redruth district and 90 of these had returned from South Africa.

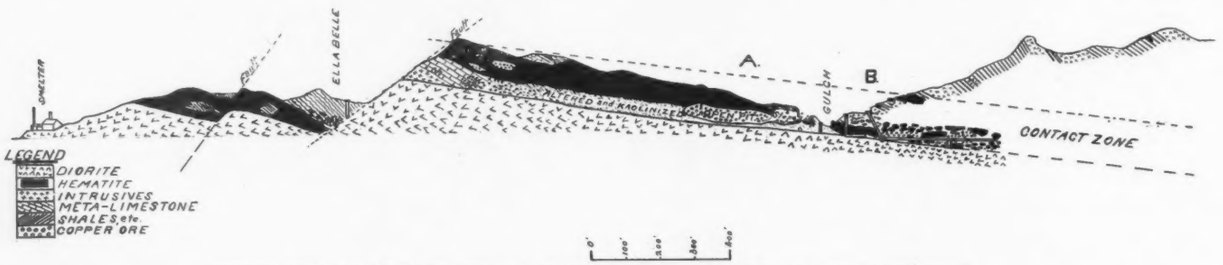
[1]This JOURNAL, Jan. 3, 1903.

THE PLANET COPPER MINES.

By H. L. McCarn.

As a type of contact metamorphic deposit the ore bodies on Bill Williams Fork, Arizona, are interesting. The formation is probably pre-Cambrian, and, in the vicinity of the mines, is made up of shales and impure limestones metamorphosed into slaty and schistose rocks, with intrusive igneous material, the whole often being interwoven as if kneaded together. But, as a rule, the sedimentary character of the formation is plain. Overlying these beds, apparently conformably, are quartzites, etc., also traversed by intrusions of igneous rock, in which copper and gold deposits are found. As a rule, however, the ore seems to be confined to the sinuous intrusive contacts, and to be in the form of small, irregular stringers. The dips of all the beds mentioned are to the southwest, and, instead of being folded, they form a monocline broken by strike faults. A greenish rock, gneissoid in texture, underlies the sedimentary series. It is locally called 'diorite,' and is a rather finely granular quartz-feldspar rock, with subordinate hornblende—the last occurring along the foliation. This formation appears to be a deep-seated intrusive of some sort, and cuts the bedding of the sedimentaries obliquely. The main iron and copper deposits of the district lie along this contact, but always above the diorite, which appears to constitute the footwall or floor of the ore bodies. The line of contact is, in most places, a remarkably regular, even plane, and dips W.N.W. at an angle of about 15°. The accompanying sketch affords a section from the Planet smelter, at the southern edge of the valley, southwesterly for about 3,500 ft. As this course conforms to the strike of the contact plane rather than the dip, the inclination shown is only about 6°, but, as the formation is well exposed along the eastern side of Planet gulch, through the old surface workings (marked A) to a point where the gulch bends sharply to the east (marked 'Gulch'), and as the trend of greatest mineralization is thought to be southwesterly, the section illustrates the conditions better than would one made along an east and west line. The ore horizon, or contact zone, is about 150 ft. thick, and is marked by a hematite outcrop which can be seen for 10 miles as the valley is approached from the north, the black belt appearing like a great flat ledge cutting the gray formation; the breaks in its contour, due to faulting, being particularly noticeable from a distance. Another formation characteristic of the contact zone is a dark gray limestone, extremely hard and tough, with brown weathered surfaces, pitted and hackly from long exposure to the atmosphere. This rock has generally been thought to mark a particular stratigraphic horizon, but, as it is found over a large area, but only in the contact zone, it is evident, when the diverging dips of the contact plain and the sedimentary bedding are considered, that, as a distinct type, it owes its characteristics to contact metamorphism. It is richer in carbonate of lime than any other formation in the district, probably by reason of the introduction of secondary calcite either at the time of its metamorphism or subsequently. An average sample carries about 42 per cent CaO, 12 per cent SiO_2, 4 per cent Fe, and 8 per cent Al_2O_3, with the necessary combining percentage of CO_2, but gradations can be found from a quasi-marble to a dense hornstone yielding no effervescence with hydrochloric acid. Parts of the contact zone are made up almost entirely of this metamorphosed limestone, practically barren of ore. In other places the limestone and hematite are blended, and the lines of junction are filled with chrysocolla, beautifully banded in green, blue, red and black ribbons, the ore streaks being from 2 in. to 2 ft. thick. Many good exposures of copper ore occur in this formation, sometimes associated with hematite. But in the absence of iron it is generally found that the limestone contains much of the old intrusive matter which makes such a complex of the whole sedimentary series. And, in this case, the copper ores seem to show a preference for the irregular division lines between the two. The Ashley ore-body is of this type, but here the ore concentrations seem to be influenced largely by a vertical and other crevices due to earth movement; and the silicification of the limestone immediately adjoining the ore, as well as much, at least, of the copper mineralization, appear to be due to the circulation of silicious and copper-bearing waters through the fractures, and the replacement of the lime with silica and copper minerals. The ore is principally copper silicate with stringers and nests of cuprite, it is uncovered on the surface for 200 ft. in length by from 40 to 60 ft. in width, and enough work has been done to expose several thousand tons, which by rough sorting (throwing out about one-half) will average 10 per cent copper. A large number of outcropping ore-bodies have been found; most of them are but slightly developed as yet. Faulting and erosion have brought the contact zone to surface over a considerable area, and it is only to the south and west of the Planet workings that it disappears from view under the hills.

A common surface ore is a hard, fine-grained, reddish-brown material of about the following composition: SiO_2 47 per cent, Fe 17 per cent, Al_2O_3 5 per cent. Cu 16 per cent, etc. Patches of this ore are often found in the otherwise unaltered hematite and make a valuable fluxing ore. Not much carbonate ore is visible at surface, but it is relatively abundant in the new workings at a depth of 200 ft. Evidence of recently formed silicate of copper is plentiful, such as the cementation of gulch gravel into conglomerate averaging 5 per cent Cu, and the coating of the pebbles, which have been washed into the old workings, with copper silicate, sufficiently to make them assay 3 per cent copper. What exploratory work was done in early days in search of the extension of the Planet ore shoot was to the west, by inclines, following a talc parting which marks the contact plane. An efflorescence of copper sulphate is found in these drifts and elsewhere on exposures of the talc streak, and, in places, a comb-like structure, due, no doubt, to successive deposits of sulphate crystals, makes very handsome specimens, which would brighten up any mineral collection could they be preserved from dehydration. The heaviest deposits of sulphate are found where 'verticals' in the overlying formation cross and drag with the talc parting. So far as determined these 'verticals' do not penetrate the underlying diorite, but they seem to be important conduits for copper solutions, and the concentrations of high-grade copper ores along such verticals (often well defined and slickensided) are significant. The new workings have shown that the contact plane, still marked by the talc parting, keeps its even, regular position for 500 ft. from the point where it passes under the hills to the southwest of the old workings. A shaft (B) was sunk through partly iron-replaced rock—a shattered formation re-cemented by iron oxide—for 30 ft., when massive hematite was entered. Twenty feet from the bottom the hematite became soft and contained considerable decomposed pyrite and chalcopyrite, and averaged 5 per cent copper. At 80 ft. a little surface water, heavily charged with copper sulphate, was encountered, and the next 3 ft. were sunk in soft blue clay—the talc parting or solution channel, beneath which lay the diorite, itself but little altered. For 100 ft. the drifts passed through hematite carrying good copper values where not too much decomposed. The best ore was a sulphide-bearing gray rock belonging to the sedimentary formation, which was only partially iron-replaced. A black coating—probably chalcocite—on some of the sulphide no doubt increased the copper percentage, but, on the whole, this portion of the mine has been impoverished rather than enriched, and the profuse deposit of copper sulphate which forms on the sides of the drifts, as the ground is opened up, shows that the leaching process is still going on. Much iron gossan, with open cracks and old water-courses, has since been penetrated. Some good ore of about 16 per cent grade has recently been cut 300 ft. from the shaft and exposed for 60 ft. in length by about 30 ft. wide. Important ore-bodies are not looked



SKETCH SECTION OF EAST SIDE OF PLANET GULCH AND HILL TO THE SOUTHWEST.

for until the leached zone is passed through. The origin of the hematite and primary copper ores in this district is an interesting question. That they occupy a sheared zone along the contact of a great intrusive igneous mass, with old sedimentary beds, seems manifest. The surface deposits of copper oxides and silicate are, no doubt, due to the leaching of sulphides, which were probably an original constituent of much of the hematite, as well as of some of the old intrusives in the sedimentaries.

THE MONT PELE SPIRE

Mr. G. K. Gilbert writes in *Science* to point out that the formation of the famous natural obelisk in the orifice of the volcano is due probably to the cessation of escaping gas at the moment when the magma is solidifying. He says:

"It seems to me quite clear that this process of extrusion is, properly speaking, volcanic eruption; that molten magma rising from some deep source undergoes a change of physical condition in the conduit, and is thereby enabled to issue in solid form. The process is so rapid as to preclude the hypothesis that solidification results from loss of heat by conduction. Even if surface water finds its way to the walls of the conduit, and is able there to cool the exterior part of the rising column, there can be no appreciable effect on the interior part of the column within the short time indicated by the history of the eruption. The suggestion that surface water is absorbed (as steam) by the lava and the lava is thereby cooled, encounters a double objection: (1) That rising lavas, undergoing relief from pressure, are in condition for discharging, instead of absorbing, gases; and (2) that the diffusion through the rising magma of water absorbed in the periphery of the conduit would require as much time as the cooling of the magma by conduction.

"I ascribe the solidification, instead, to the escape of gases originally contained in the magma, that is, of gases contained before the magma rose in the conduit. Steam is assumed to be the principal gas; as it passes from the condition of absorption into the free condition, forming bubbles in the magma, it is greatly expanded, and this expansion consumes energy. The case is analogous to that of a body of air rising through the atmosphere and becoming cooler by reason of expansion.

"If this view is correct, then the remarkable feature of the process involved in the production of the Pelé spine is the arrest of the exclusion and expansion of the gas at the precise stage necessary for the solidification of the magma. Usually it either falls short or passes beyond; in the one case producing a liquid magma charged with bubbles; in the other bursting the solid vesicles and blowing their fragments into the air. The rarity with which the process is arrested at the completion of solidification is probably to be ascribed to the fact that it interacts on itself. The amount of gas which can be held in solution by a particular magma depends chiefly on the pressure to which it is subject. As pressure is gradually relieved during eruption, more and more of the contained gas is discharged. When explosion of vesicles is once initiated at the top of the column it reduces the pressure on lower parts by carrying away some of the lava, and this loss of pressure in turn promotes the exclusion of the gas. If this view of the process is correct, the paroxysmal character of explosive volcanic eruption is strictly analogous to that of geyser eruption."

RECENT LITERATURE ON ECONOMIC GEOLOGY. XX.—COAL.

By H. FOSTER BAIN.

Coals and Coal Mining Methods of the Pocahontas Field. By George L. Fowler, *Engineering Magazine*, May, 1904. pp. 217-232.

A very brief but comprehensive account of the geology, mining methods and character and value of the coal.

The Cumberland Gap Coal-Field of Kentucky and Tennessee. By G. H. Ashley. *Bulletin 225*, United States Geological Survey, pp. 259-275.

A concise preliminary statement of a recent survey of this important field.

The Cumberland Gap coal-field forms part of the eastern edge of the Appalachian coal-field. It lies between Pirie and Cumberland mountains and extends from Fork mountain to the heads of Poor and Clover forks of Cumberland river, having a length of 90 miles and a width of 15 to 20. These boundaries are determined by notable faults. The country is rough, the mountains rising 1,000 to 2,000 ft. above the adjacent streams. The basin is a flat-bottomed syncline with sharply flexed sides. From the axis the beds rise possibly 100 ft. to the mile to the edge, where they are sometimes perpendicular, though usually less than 70°.

So far as has been determined all the coal-bearing rocks are of Pottsville age. The lower portion of the section is made up of the Lee conglomerate, which contains two coal beds of workable thickness. These are exposed only along the edge of the field, where they lie at a high angle and are so badly crushed as to be of little present value.

Over 2,300 ft. of strata occur above the conglomerate in Log mountain. There are at least 40 coal beds, of which 13 are of workable thickness. Many are believed to be persistent over the entire area and 8 are now being worked. All are divided by partings. The upper coals are the best, but have the more limited extent. The principal ones are as below, the sections given being representative:

Name.	Coal. ft.	Coal. in.	Partings. ft.	Partings. in.
Log Mountain Area.				
Red Spring	5	5½	1	1½
Upper Hignite	4	10	1	9
Lower Hignite	5	1		3½
Klondike	5	10		1
Poplar Lick	5	8		3
Sandstone Parting	4	6½	1	4
Mingo	4	6½		10½
Chenoa	5	9		
Bennett Fork	3	5		11½
Turner	4	3	1	5
Harlan Area.				
Neal	7	6		10
Creech	4	4		
Kellioka	5	6	1	11
Harlan	5			7
Durham	4			1
Howard	4			
Robbins	3	3		1

The Chenoa and Howard have each an upper bench of cannel. The Lower Hignite, on account of its good section and quality and despite its relatively small area, is quite important. The Mingo is the most important coal in the Bennett Fork region. The Harlan is the most valuable in the eastern area. The Neal has a thickness of 5 to 13 ft. commonly yielding 7 ft. of workable coal.

The quality of the coals is indicated by the following analyses:

	Mingo.	Sandstone Parting.	Klondike.	Hignite.	Art of Harlan District.
Moisture	3.11	2.00	3.11	2.00	3.28
Vol. Comb.	32.65	33.00	32.05	33.44	36.62
Fix. Carb.	59.83	57.00	59.83	60.85	54.40
Ash	4.41	7.20	4.41	3.10	4.84
Sul.	.75	.55	.76	.51	.85

The mines around Middlesboro now produce nearly 1,000,000 tons and with additional railways a largely increased production may be expected. Coke is made at Mingo to supply the Middlesboro iron furnace and the Ducktown smelters, but the main market for the coal at present is afforded by the railways.

THE STUCHLIK ACETYLENE SAFETY LAMP.—The designer of this lamp observed that the presence of a small per cent of fire damp in mine air causes an acetylene flame to be surrounded by a greenish cap. The lamp has a magnetic-looking device, an igniter, and suitable containers for water and calcium carbide. The flame is said to be of 8-candle power, and a charge of 5 oz. of carbide is said to last 10 hours. The presence of one per cent of methane, it is claimed, can be detected by turning the flame down till it is but one-twelfth of an inch high.

FIELD WORK OF THE UNITED STATES GEOLOGICAL SURVEY.—Besides investigations confined to the limits of one or two States, several lines of work will be taken up this year that will cover wide areas. The glacial geology of the United States will be studied by Professor T. C. Chamberlin, who will have the assistance of Messrs. R. D. Salisbury, W. W. Atwood, F. H. H. Calhoun, Frank Leverett, W. C. Alden and F. W. Taylor. The glacial areas in the Rocky mountain region will be investigated by Professor Salisbury, assisted by Messrs. Atwood and Calhoun. A monograph on the Pleistocene formations of the Lower Peninsula of Michigan and adjacent portions of Indiana will be completed by Mr. Leverett. Mr. Alden will map portions of southeastern Wisconsin for folio publication. Professor U. S. Grant will make an areal and economic survey of the Mineral Point quadrangle, Wisconsin. The work will probably be done in co-operation with the State Survey of Wisconsin.

The pre-Cambrian and metamorphic geology of the United States will be studied under the direction of Professor C. R. Van Hise, who will also complete his report on the geology of the Lake Superior region. In this work he will be assisted by Messrs. C. K. Leith and W. N. Smith. He will also continue investigation of the metamorphic iron-ore deposits of the United States, particularly those of the Rocky mountain and Great Basin region.

Mr. E. C. Eckel will complete a study of the cement industry of the United States and will also complete an investigation of the slate industry of the United States, directing the work of Professor A. H. Purdue in Arkansas and Professor T. N. Dale in Virginia, West Virginia, Maryland, Pennsylvania, Maine and Vermont.

Several States will be included in an investigation by Mr. H. Foster Bain of the lead and zinc deposits of the upper Mississippi district in Illinois, Iowa and Wisconsin. In addition he will examine certain copper deposits in Shannon county, Missouri, associated lead and zinc ores in St. Genevieve county and in the Mine La Motte district, and the St. Clair and Granby mines in southwestern Missouri. He is also to re-examine the more important lead and zinc mines of the western Kentucky district and to make a reconnaissancce examination of the lead and zinc district of the Appalachian valley in Virginia and Tennessee. Mr. E. O. Ulrich, who is to investigate the Silurian and Ordovician paleontology and stratigraphy of central Missouri, will co-operate with Mr. Bain.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sakes and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of this JOURNAL.

Mortality in South African Mines. Report to the Colonial Office. London, England; H. M. Stationery Office. Pages, 16.

Prospecting for Coal. A Sample Digest. Massillon, Ohio; the Edward Christman Company. Pages 32; illustrated.

Twenty-eighth Annual Report of the Inspectors of Explosives, Great Britain, 1903. J. H. Thomson, Chief Inspector. London, England; H. M. Stationery Office. Pages, 236.

Transactions of the Association of Engineers of Cornell University. Volume XII, 1903-4. Ithaca, N. Y.; published by the Association. Pages, 88; illustrated.

Jahrbuch der Elektrochemie. Vol. IV. for the year 1902. By Heinrich Daneel. Halle, a. S., 1904; Wilhelm Knapp. Pages, 750; illustrated. Price (in New York), $8.

Report on the Health of Cornish Miners. By J. S. Haldane, Joseph S. Martin and R. Arthur Thomas. London, England; H. M. Stationery Office. Pages, 112; illustrated.

United States Fish Commission. Echinoderms of the Wood's Hole Region. By Hubert Lyman Clark. Washington; Government Printing Office. Pages, 30; illustrated.

Anti-Injunction Bill. Complete Hearings Before the Committee on the Judiciary of the House of Representatives. Washington, Government Printing Office. Pages, 712.

Gold Assaying. A Practical Hand-book. By H. Joshua Phillips. New York; the D. Van Nostrand Company. London; Crosby Lockwood & Son. Pages, 152, illustrated. Price, $2.50.

University of Texas Mineral Survey. Bulletin No. 8. The Geology of the Shafter Silver Mine District, Presidio County. By J. A. Udden. Austin, Texas; published by the University. Pages, 40; with maps and illustrations.

Geologic Atlas of the United States. No. 101. *San Luis Folio, California.* Five sheets, with 16 pages text. *No.* 109. *Cottonwood Falls Folio, Kansas.* Two sheets, with 8 pages text. Washington; engraved and printed by the Geological Survey.

Transactions of the Institution of Mining and Metallurgy. Volume XI, Parts 1 and 2; Winding Plants for Great Depths. By Hans C. Behr. With Discussions by Various Members. London, England; published by the Institution. Two volumes; illustrated. Price, $10.

BOOKS REVIEWED.

The Miner's and Prospector's Pocket Guide. Compiled by T. R. Suttie. London: E. & F. N. Spon, Ltd. New York: Spon & Chamberlain. Pages, 85.

This little handbook has the merit of compactness, and contains a great deal of information It is rather better than several manuals we have seen of like scope, but we notice some typographical errors and a few inaccuracies of statement; and the processes given for reducing ores are not always standard, nor as complete as they might be. Thus, there is nothing said about pyrite smelting in the treatment of copper ores. The booklet takes up the principal rocks, rock-forming minerals, metals and ores, stating test methods of reduction. It also mentions the properties of various elements and salts, and contains a glossary of terms.

Geologic Atlas of the United States. No. 106. Mount Stuart Folio. Washington; engraved and printed by the Geological Survey. Five maps and 10 pages of text. Price, 25 cents.

The area described in this folio is situated nearly in the center of the State of Washington, and includes portions of Kittitas and Chelan counties. It lies on the eastern slope of the Cascade mountains, and the northern half of the area includes the foothills and peak of Mount Stuart, which is the culminating point of a spur of the main Cascade range. The topographic features of the district are rather uncommon, Mount Stuart itself rising to an elevation of 9,470 ft., while its southern face is a precipitous slope rising 5,000 ft. or more above Ingalls creek. The dissection of the mountain and its lower ridges is extreme, the divides being narrow and the crests of the ridges often so sharp as to be almost impassable. Landslides are noticeable features, the landslide areas aggregating probably 20 square miles.

Owing to the dissection of the strata the geologic record is well shown. The area contains both the oldest and youngest rocks thus far discovered in the northern Cascades. They are naturally divided into Tertiary and pre-Tertiary formations, the pre-Tertiary being of varied composition, all more or less altered, and of undeterminable age; while the Tertiary are mostly sandstones and shales, with lavas and beds of tuff. The pre-Tertiary rocks are probably of Paleozoic age, and the formations are differentiated into the Easton quartz-mica schists, probably in part a metamorphosed sedimentary series, the Peshastin black slate and the Hawkins volcanic rocks, breccias, tuffs and amygdaloids. In places the quartz-schist changes to a jasper quartzite. with considerable magnetite. The Hawkins and Peshastin formations together have a strong resemblance to certain Carboniferous formations in British Columbia, and in the Sierra Nevada. No fossils have been found. In the Mount Stuart massif are belts of peridotite and serpentine, while the peak of the mountain is composed of a granular rock classified as granodiorite. Dikes of an acid rock cut the serpentine, and are probably associated with the granodiorite.

The Tertiary rocks of the area include the Swauk, Roslyn and Manastash formations, the two latter being separated by an extensive series of volcanic rocks, and the Teanaway basalt. These are of Eocene age. The Miocene rocks comprise two lava formations, with associated intrusive rocks and one sedimentary formation, the Ellensburg, made up of friable light-colored sandstones and conglomerates. There are several areas of rhyolitic lava, which may be of Pliocene age.

The economic resources of the district are the gold deposits and the coal-beds. There are three gold-bearing districts in the quadrangle, and the output of gold from Kittitas county for the years 1884 to 1895 amounted to $764,163. Auriferous gravels of varying degrees of richness are found in the Swauk and Peshastin districts. Some of the deposits are being worked on a large scale. The gold-bearing veins near Blewett have been productive for about 25 years. Much of the ore has been low-grade. The largest mill yet erected is one with 20 stamps on the Warrior General. The gold veins are sometimes wide, but generally irregular, and the values are mostly in free gold. In the Swauk district the gold occurs in narrow fissure veins of quartz, with some calcite. The gold is mostly free, with a small amount of sulphides, and is irregularly distributed. Copper, nickel and quicksilver are reported in the quadrangle, while the free gold in the quartz veins often carries a considerable percentage of silver. By far the most important mineral resource of the country is coal, which occurs in the Roslyn formation. It is a good coking coal, is well adapted for gas making, and is also an excellent railroad fuel. The mines of the Northwestern Improvement Company, at Roslyn and Chelan, constitute the largest colliery in the State. The seam worked measures 4 ft. thick, and the coal is shipped run-of-mine. The daily capacity of this colliery is estimated at 5,000 tons, and the output of coal in the Mount Stuart quadrangle in 1902 was 1,240,935 tons.

Anthracite Coal Communities. A Study of the Social, Educational and Moral Life of the Anthracite region. By Rev. Peter Roberts. New York; the Macmillan Company. London; Macmillan & Company, Ltd. Pages, 388; illustrated. Price, $3.50.

The author, who has a parish at Mahanoy City, is much better qualified to discuss the life of the anthracite regions than some person not a resident, unfamiliar with mining, who bases his conclusions on what he has seen on a short visit, perhaps as a newspaper correspondent during a strike, supplemented by a superficial reading of Government or State reports. Mr. Roberts claims to know much of anthracite mining; he has written a book on the 'Anthracite Industry,' and was a witness for the miners before the Anthracite Strike Arbitration Commission. Some of the conclusions he had put down in his book, it may be remembered, were rather rudely shaken by the attorneys for the mining companies, who read many extracts from the 'Anthracite Industry' and rather bothered Mr. Roberts by asking him to reconcile contradictory statements. It is to be presumed that Mr. Roberts has remembered this cross-examination, and in the present volume has tried to avoid contradictions.

The book contains a great mass of information relating to the so-called Slavs and the Italians, who now constitute a majority of the anthracite mine workers. Under the general name of Slav are included Russians, Lithuanians, Poles, Hungarians, etc.—people who come from Southwestern Russia and from Austro-Hungary. They began to arrive at the anthracite mines some twenty years ago, and of late years the movement has been heavy, so that in Northern Hungary may be found many villages which practically contain only old people, women and young children, all the able-bodied men having emigrated to America. What we shall do with these people, or what they will do to us are questions of pressing importance calling for investigation and discussion. Mr. Roberts, a clergyman, with excellent opportunities for getting his information at first hand, writes entertainingly if not always convincingly. His book contains much about the daily lives of the people, their habits, ambitions, good qualities and vices, and also contains sta-

tistical details of population, occupation, illiteracy, crime, marriages, deaths, etc.

Space forbids as detailed a review of the book as the importance of its topics justifies, but a few criticisms are permissible; and the first criticism that a man who has an accurate knowledge of the region may make is that it is a pity Mr. Roberts should be guilty of some obvious exaggerations. For instance, he says in his opening pages that through mining operations in the anthracite regions the climate has been changed, the soil made less fertile, the streams are so defiled with mine water as to threaten the health of the inhabitants, the face of Nature is despoiled, "culm and rock heaps, polluted streams, bare and barren hills, caveins and strippings make up the landscape which greets the eyes of thousands, and if they are polluted in mind and body we need not be surprised." This is depressing if true.

As a matter of fact, there is no good reason for believing that the climate has changed. The United States Weather Bureau has not shown that the cutting of timber has any marked effect on rainfall. As to floods, it must be remembered that the obstructing of river channels by railroad embankments, bridges and approaches has much to do with causing high water—witness the terrible Johnstown flood. Recent investigations by the United States Geological Survey have shown that mine water charged with sulphates of iron and alumina precipitates the organic matter and kills bacterial life in the rivers; hence talk of polluted streams is moonshine. Moreover, impoverishment of soil and the necessity of using artificial fertilizers have nothing to do with mining—as the worn out cotton and tobacco fields of the South can testify. As to the face of Nature being despoiled—well, an anthracite breaker is not pretty, nor is a culm bank, but tired city eyes that may view the lovely Wyoming Valley from Nanticoke to Pittston, or even the rugged hills above Mahanoy, will hardly, we fancy, agree with the author. Culm banks and other unpleasant objects are mere dots on the landscape. Any miner in Mahanoy can, by a short walk, see more of the beauties of nature than can thousands upon thousands in our large cities.

When it comes to details of life, to statistics and to his views of things in general, Mr. Roberts is guilty of fewer exaggerations, but yet his book has some rather serious defects. For instance, from what sources are compiled his tables of statistics? Everyone has heard of lies, other lies and statistics, and in a book of this scope and purpose there would have been no harm in telling doubters where they could look if they cared. Again it may be noted that poverty, drunkenness, brutality and crime are found in many places and are not necessary accompaniments of mining, while political corruptions, the greatest evil of all, is not confined to Pennsylvania. The belief that anthracite miners are underpaid seems to be deep rooted with the public, as it continually finds expression in the daily press—yet the most careful investigation ever made, that of the Anthracite Strike Commission, found that the mine workers were as well paid as in several other callings requiring a like amount of skill. As to the dwellings of the miners—some of the companies are not as careful as they might be in providing houses, and some provide comfortable homes—a fact which Mr. Roberts fails to emphasize.

Certain conclusions reached by Mr. Roberts are highly instructive. Writing as a friend of the miners he finds that intemperance is responsible for most of the miners' troubles, while the social unrest in the region by the hatred of the rich is fostered by the vile sensational newspapers, which form the chief literature of the people. In other words, stricter regulations in the sale of intoxicating liquor and the suppression of yellow journalism would do much to promote thrift and industrial peace.

In fine, in spite of all that Mr. Roberts says, the anthracite region is probably no worse than many other sections of our country. With all his faults the Slav is a more helpful and hopeful citizen than the descendants of good Anglo-Saxon stock that live in many New England hill towns or in the poor farms of the pine belt in the Southern States. Much depends on the point of view. Mr. Roberts, if he were to make a detailed study of life at mines of another sort, might change his mind. We feel sure that he would think Pennsylvania anthracite miners not nearly as badly off as his book implies, if he were to investigate the economic, social and moral life of some New England manufacturing towns or of Jerome, Arizona.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the Editor.

We do not hold ourselves responsible for the opinions expressed by coresrpondents.

Mexico and the American Prospector.

Sir.—The army of American prospectors bent on a peaceful conquest of Mexico has been increasing remarkably during the last year. It may not be easy to determine whether this class of men has been driven out of the United States by the unsettled labor conditions, that have made it impossible to coax capital to look at a meritorious mining proposition, or enticed here by the Mexican boom, already on the wane. The fact remains that the movement is growing, and the unfortunate thing about it is that the typical American prospector, who has built our mining industry, is a failure in Mexico. The very fact that he is in a country where people look down at manual labor as degrading is enough to drive him back to his native country, for his religion is his belief in the dignity of labor with the pick and the shovel. If he stays he becomes galvanized, and then God help him, for he won't help himself. It is a fortunate thing for our country that once in this state he never returns to the United States.

Conditions here are so different from those in the United States that the American prospector and the equally picturesque American mining promoter are not important factors in the problem of how to introduce a legitimate mining proposition to the investing public.

In the first place Sonora, for I am best acquainted with Sonora and Sinaloa, although I think the points I emphasize here will be found to be applicable to the larger part of this republic, is one of the best prospected districts in the world. Wherever you travel, no matter in what out of the way place you may be, sooner or later you will see a native wandering over the hills looking perhaps for some stray animal, and if you watch long enough you will see him stoop down to pick up some piece of mineral that has attracted his attention. No set of people have a quicker eye for ore than these Mexican Indians, many of whom as children have been employed as ore sorters at the nearest producing mine. He is, of course, most familiar with silver ores, and seems almost to have developed a sixth sense whereby he can detect the silver that may exist in a most barren looking rock. Copper ore has such marked characteristics that the Mexicans identify it immediately, although there are still places so far out of the way that the Mexicans do not appreciate its commercial value as yet. Free gold ores they identify immediately, as they are master artists with the horn spoon, and the only ore they would be likely to overlook would be a gold-bearing rock, the gold of which is not visible in the horn spoon. Of course, they are entirely unacquainted with the rare minerals or metals.

The Mexican of to-day is not naturally a miner, in the sense that he does not care to take hold of and develop his properties, for the mixture of Indian blood has cooled the Spanish frenzy to dig for treasure. The original Spaniards were the most indefatigable of miners, and everywhere one travels one will find that almost every particle of mineral-bearing ground has been turned by the *antiguos*. So it happens that the *peon* who finds a good piece of ore takes it to his *padron*, who denounces it but does not develop it; for, although he has lost the energy to work the mines, he still inherits the desire to own mines; and with him it is much like the love of a miser for his money: the former would as soon think of working and developing his property as the latter of spending his money.

Although the Mexican expects, some time or another, to get an American to develop his mine for him, he still looks with suspicion on the *gringo*, and one will find that it is hard to get good terms or do business without living down here and gaining their confidence. Mexico has been, and is, overriden with American adventurers, who take bonds on properties that they have no intention of handling, and offer ridiculous prices for the crudest of undeveloped prospects; and for this reason we hold a similar position before the judgment of the people as the prisoner does before the Mexican law. We are judged guilty until we prove ourselves innocent, but after you have won the confidence of the people, you will not find that it is hard to do business.

Mexico does not need the prospector, for the Republic is well prospected, nor the mining promoter, for the mines are not as yet in a position to be put before the investing public; but the industrious, practical miner, who has made a small stake or saved up a few thousand dollars and who has come down here to pick up something that his judgment tells him is good out of much that is worthless, and then develop it and put it in such shape that it can be placed on the market. Whatever drawbacks Mexican labor may have, if directed by a competent man it is very much cheaper than the more skilful American article, especially for the purpose of polishing up a prospect, and the taxes and duties do not become important items in the profit and loss page of the ledger until after the mine begins to produce.

CYRUS F. TOLMAN, JR.

Alamos, Sonora, Mex., June 16, 1904.

ABSTRACTS OF OFFICIAL REPORTS.

North Star Mines Company.

This company owns a mine in Nevada county, Cal., which has been operated for a number of years with success. The capital stock authorized is $2,500,000 in shares of $10 per value; 13,818 of these shares being held in the company's treasury at the close of the year. The report which covers the year 1903 shows that the total production of ore during the year was 28,790 tons, of which 10,960 tons were from the North Star incline shaft, having an average value of $33.43 per ton, 16,435 tons from the North Star Central shaft, average $22.28 per ton and 1,395 tons from the Gold Hill shaft, average $2.56 per ton. The financial statement of the operations for the year shows results as follows:

	Amount.	Per ton.
Returns from ore mined	$736,087	$25.57
Interest and miscellaneous	7,223	0.24
Total receipts	$743,310	$25.81
Operating expenses	$235,653	$8.19
General expenses	23,511	0.81
Development expenses	134,747	4.68
Improvements	61,988	2.15
Property purchased	39,772	1.38
Sundry expenses	969	0.03
Total charges	$496,640	$17.24
Net receipts	$246,770	$8.57

Dividends paid amounted to $118,068, leaving a balance of $128,602. The surplus brought forward from the previous year was $113,712, making a total surplus, at the close of the last year, amounting to $242,314; of which $224,144 was in cash, and $18,170 in materials and supplies.

The report of President Jas. D. Hague, after giving the receipts and expenses as above, says that the current operating expenses were 35.2 per cent of the total product, while the outlay on capital account amounted to 32.3 per cent, leaving 32.5 per cent as cash surplus available for dividends. For many years the average return from North Star ore was about $18 per ton. Last year the yield was unusually high, having been $26.74 per ton. This was due in part to the exceptionally rich ore-body which was opened in 1902 between the 1,100 and 1,900-ft. levels, and which was developed 300 ft. further during 1903 to the 2,300-ft. level. From the deeper workings of the mine opened from the Central shaft the ore was also of good grade, averaging $22.28 per ton. This ore from the deep levels shows an increase in value over that of a number of previous years, indicating a possibility that the mine may prove to be richer in depth. Extension along the lower levels shows the continuity of the vein, and it is now believed that the mine may be permanent and profitable to a depth of 4,000 ft. of the dip. There is still a large area of ground unworked above this depth. There is also a speculative possibility that the mine may continue to yield below 4,000 ft. This, of course, remains to be proved.

The condition of the mine and its possibilities justify the considerable outlay for development work which is reported. Expenditures for development were $134,747, of which $90,792 were expended in the North Star and $43,954 in the Gold Hill mine. Improvement account amounted to $61,988, of which the sum of $23,703 was expended on the Wolf Creek power plant and in erecting a new air compressor. The old 40-stamp mill was improved, and the sum of $26,446 expended on the new 40-stamp mill, which is now completed. This mill is near the central shaft, and will double the former crushing capacity. The old and new mills together should be able to treat from 50,000 to 60,000 tons of ore yearly.

The purchase of the Gold Hill mine was completed during the year. The company also purchased the Irish-American and several associated mining claims adjoining the North Star mine on the north and overlying the dip of the vein. This purchase prevents a complicated litigation and settles some outstanding disputes. The Loutzenheiser Ranch and an interest in the Lamarque claim, adjoining the North Star on the south, have been purchased, making a useful addition to the property. The company's property now includes a tract three miles long from north to south, and varying from one-half a mile to a mile wide from east to west. It is so situated that there is no possibility of further litigation over the claims. The company is in good financial condition, having a surplus at the close of the year amounting to $224,114, besides materials and supplies on hand valued at $18,170. The president thinks there is every reason to believe that the mines may continue to be active producers for many years.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Garnet.—Will you kindly inform me as to the value of garnet for commercial purposes—that is, for use as an abrasive. Would you consider the small specimens which I send you a fair sample of commercial grade, and what is your opinion regarding its value when crushed and separated from the enclosing rock? Kindly direct me to any literature on the subject.—W. B. H.

Answer.—The value of common garnet for abrasive purposes varies from $20 to $35 per ton, according to quality. A small quantity of high-grade material is marketed at even higher prices. The specimens you mention have not been received, but we could not undertake to estimate their value, as actual tests would be required to secure any reliable information on this point. In general, however, the abrasive qualities of garnet depend upon its hardness, purity and physical condition, more particularly its property of cleavage or parting, which causes the larger crystals when crushed to suitable size to break up into particles of sharply angular form. As an abrasive it is superior to quartz, but less valuable than corundum and emery. You might possibly get an opinion as to the character of your mineral by sending specimens to some of the manufacturers of abrasives. Herman Behr & Co., 75 Beekman street New York; the National Abrasive Co., Waynesville, N. C.; and the American Glue Co., 417 Atlantic avenue, Boston, Mass., are consumers of garnet for this purpose. There has been very little published on the subject of garnet, but you can obtain some information from the volumes of *The Mineral Industry*, especially Vol. VI. The garnet mining industry is a limited one, and the few concerns engaged in it naturally are averse to publication of technical details.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DUTY ON COPPER PIPES OR TUBES.—Tubes or cylinders made of copper, 14 in. long, the inside diameter being 4¼ in. and the outside diameter 4 11/16 in., are dutiable under the provisions of paragraph 176, act of July 24, 1897, as copper pipes.—Appeal of Marshino & Co. from Collector of Customs at New York; Board of General Appraisers.

DUTY ON HOOP OR BOND STEEL.—Hoop steel put up in coils 125 ft. in length is dutiable as hoop steel under the provisions of paragraph 128, act of July 24, 1897, and not as "hoop steel . . cut to lengths, . . . for baling cotton," under paragraph 129.—Appeal of Oliver Brothers from Collector of Customs at New York; Board of General Appraisers.

DUTY ON SHEET STEEL IN STRIPS.—It appeared that in the manufacture of certain cold-rolled sheet steel in strips, a necessary preliminary to the process of cold rolling was the process of pickling (cleaning by acid), which removes the scale and makes the surface of the steel white, the result of the subsequent cold rolling being to give the metal a bright surface; also that the brightening did not result from the picking nor from any process subsequent to cold rolling, nor from any operation distinct from that necessary to produce the steel, but was due to the cold rolling. *Held* that steel of this kind is not within the provision in paragraph 141, tariff act of July 24, 1897, for 'steel . . . cold rolled . . . brightened or polished by any process to such perfect surface finish or polish better than the grade of cold rolled smoothed only." The decision of the Board of Grand Appraisers is therefore reversed.—Appeal of Crucible Steel Company of America; United States Circuit Court, Southern District of New York.

IRON PRODUCTION OF BOSNIA.—The production of iron and steel in Bosnia is reported as below, in metric tons:

	1902.	1903.	Changes.
Pig iron	43,992	39,833	D. 4,159
Open-hearth steel ingots	17,141	17,678	I. 537
Finished steel	18,702	16,626	D. 2,076

The iron ore mined in 1902 was 133,347 tons; in 1903 it was 114,059 tons, showing a decrease of 19,288 tons.

IRON PRODUCTION IN GERMANY.—The production of pig iron in Germany for the four months ending April 30 is reported by the German Iron & Steel Union as follows, in metric tons:

	1903.	1904.	Changes.
Foundry iron	582,933	584,571	I. 1,638
Forge iron	290,903	282,174	D. 8,729
Steel pig	258,313	195,452	D. 62,861
Bessemer pig	129,189	161,122	I. 31,933
Thomas (basic) pig	1,954,136	2,071,832	I. 117,696
Totals	3,215,474	3,295,151	I. 79,677

Steel pig includes spiegeleisen, ferro-manganese, ferro-silicon and all similar alloys.

IRON TRADE OF ITALY.—There has been recently a considerable increase in the importation of scrap and pig iron by Italy. The production of the latter does not yet

reach 25,000 tons annually, whereas its consumption is computed at between 180,000 and 190,000 tons. Two new blast furnaces, however, one of which has already commenced operations at Portoferraio, are capable of yielding about 100,000 tons of forged pig iron annually. These furnaces use ore from Elba.

PATENTS RELATING TO MINING AND METALLURGY.

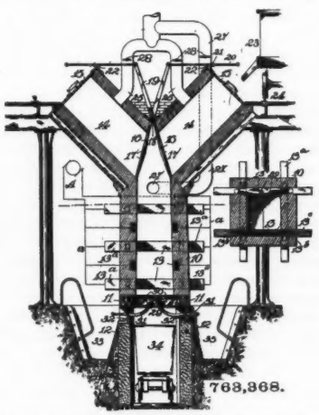
UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending June 28, 1904.

763,362. COAL SIEVE OR SEPARATOR.—John G. Brock, Excello, Mo. In a separator device, the combination with a supporting-frame, movable separator-bars disposed upon the frame, operating means for the separator-bars, and an independent lock-bar provided with projections for engaging the respective separator-bars to brace and support the same when in separated position or otherwise disposed.

763,368. ELECTRIC COKE OVEN.—Michael R. Conway, New York, N. Y. A coke-oven, comprising a body of non-conducting material, and electrical resistance-plates arranged in the inner wall of the body, the plates being in opposed pairs and the several pairs being on different horizontal planes, whereby a series of heating zones are produced.



763,368.

763,369. PROCESS OF MAKING COKE.—Michael R. Conley, New York, N. Y. A process of making coke, which consists in inclosing the coal in an essentially air-tight oven of non-conducting material and raising the inner wall of the oven by means of edectrical resistances included in the wall to a temperature higher than that obtained in the ordinary coke-ovens.

763,376. APPARATUS FOR MAKING CONCRETE WALLS.—Herman Dohl, Altoona, Pa. A wall-mold comprising supporting-irons having their inner ends embedded in the wall, vertical posts resting upon the outer end portions of the irons, horizontal mold-boards arranged at the inner sides of the posts and likewise supported upon the outer portions of the irons, and binding-pieces connecting the posts at the top.

763,383. ARTIFICIAL MARBLE.—David Feldhamer and Nathan Oelgiesser, New York, N. Y. Artificial marble composed of slaked lime, coal-ashes, zinc-white, chloride of zinc and chrome-alum.

763,391. LIFTING-BUCKET.—Peter C. Hains, Washington, D. C., and Charles R. Weaver, Baltimore, Md.; said Weaver assignor to said Hains. A bucket, comprising a substantially conical shaped receptacle, having a bottom discharge-opening, supporting-brackets secured to said receptacle and extending below the inclined sides thereof, a sliding door for closing said bottom discharge-opening and means for moving said door to permit the discharge of a part or all of the material from said bucket.

763,397. IMPULSE-WHEEL FOR FLUID-PRESSURE TURBINES.—Francis Hodgkinson, Edgewood Park, and Otto Frik, Wilkinsburg, Pa., assignors to the Westinghouse Machine Company. An impulse-wheel having a circumferential series of fluid-receiving passages each of which extends from an inlet at the wheel periphery outwardly and forwardly at a gradually-increasing depth for a portion of its length and thence rearwardly to its outlet, which is exclusively in the side surface of the wheel.

763,417. DRUM FOR HOISTING, DERRICK, OR SIMILAR ENGINES.—Almon E. Norris, Cambridge, Mass., assignor to Rawson & Morrison Mfg. Co., Cambridge, Mass. In a hoisting-drum, a central hub portion adapted to be rotatably mounted upon a shaft, and a renewable shell constituting a rope-receiving member, and shell having a central cylindrical portion which terminates at each end in an outwardly-flared portion integral with the shell and forming the flange of the drum.

763,421. ACID-PROOF COMPOSITIONS.—Frederick A. Pank, Butte, Mont. A composition of matter, consisting of linseed-oil, india-rubber, resin, beeswax, silica, red lead, and gypsum.

763,444. ORE SEPARATOR AND CONCENTRATOR.—Casper Van Hoesen, New York, N. Y. In an ore concentrator and separator the combination of a vessel provided in its lower portion with an outlet, a valve closing upward with reference to said outlet and provided with a discharge to admit of a continuous escape of the metal, and means holding the valve seated under normal conditions, but adapted to permit the valve to automatically open when the metal accumulates in the vessel and exerts an excessive downward pressure on the valve.

763,450. FERTILIZER.—Edward F. Wright, Austin, Tex. A fertilizing compound composed of iron sulphate, superphosphate of lime and kainit.

763,455. GAS-MAKING APPARATUS.—Charles M. Baker, San Francisco, Cal. An apparatus for the manufacture of either water, oil or water and oil gas, the same comprising a superheater, a generator, an upper and lower gas chamber formed within the generator, the upper chamber being adjacent to the superheater and having a conduit forming communication between said upper chamber and the superheater.

763,460. GAS PRODUCER.—Patrick J. Buckley, Waukesha, Wis. In a gas-producer, in combination, a furnace for producing gas and having an air-chamber in its walls, a hopper for feeding the furnace and having a cover, a conduit leading from the air-chamber to the hopper, and a conduit leading from the hopper to the combustion-chamber of the furnace.

763,748. METHOD OF MAKING SULPHATE OF COPPER.—Gustave Gin, Paris, France. A process of manufacturing sulphate of copper consisting in boiling a mixed solution containing sulphate of copper, sulphate of protoxide of iron and sulphate of peroxide of iron with thoroughly-roasted copper ore or cementation-copper so that the peroxide contained in the sulphate of peroxide of iron will first be precipitated, then precipitating the sulphate of protoxide of iron remaining in the solution by raising the temperature to a point above 160° C., and then filtering the solution.

763,479. PROCESS OF ELECTROLYTIC MANUFACTURE OF ALUMINUM.—Gustave Gin, Paris, France. A process of manufacturing aluminum which consists in decomposing by an electric current an electrolyte formed by a molten mixture in definite proportions of fluoride of aluminum and sulphide of sodium in which one molecule of fluoride of aluminum and three molecules of sulphide of sodium are present.

763,491. PROCESS OF MAKING NITROUS ANHYDRIDE AND NITRITES.—Hermann von Keler, Leverkusen, near Cologne, Germany, assignor to Farbenfabriken of Elberfeld Co., New York, N. Y. A process for the production of nitrous anhydride, which consists in passing a mixture of ammonia with an excess of oxygen over an oxide of a heavy metal at a temperature higher than 650° C. and lower than 750° C.

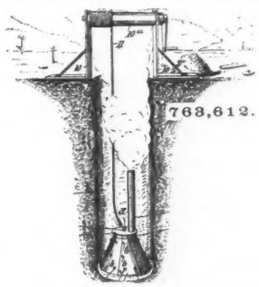
763,498. BRIQUETTE-MACHINE.—Frederick Mever, Chicago, Ill., assignor of five-sixths to Eugene J. Kirby, Chicago, Ill., and the Chicago American Fuel Briquetting Company, Chicago, Ill. The combination of a frame; a member rotably mounted in said frame and having an annular series of mold-apertures extending longitudinally through same; a plunger movable in said frame and coacting with said mold-apertures; an annular series of teeth extending around the periphery of said member; a cam journaled on an axis transverse to that of said member and having on its periphery a thread meshing with the teeth on said member and adapted to intermittently, rotate said member during the rotation of said cam; suitable connection between said plunger and said cam, whereby said member will remain stationary when said plunger is engaging one of said apertures and will be advanced to bring a succeeding mold-aperture into alinement with said plunger after said plunger is withdrawn from said aperture; and means for operating said plunger, member, and cam.

763,533. CONTINUOUS KILN.—Peter L. Youngren, Milwaukee, Wis. The combination of inclosing walls forming a series of brick-receiving compartments; a gas-producing oven for each compartment, communicating with a distributing-flue in the side wall of the compartment; said wall having branch flues leading downwardly from the distributing-flue and communicating with the lower portion of the compartment, and corresponding branch flues leading upwardly to the exterior, and provided with suitable removable covers.

763,559. METAL-EXTRUSION APPARATUS.—George E. Heyl-Dia, Warrington, and Arthur Musker, Liverpool. In a metal extrusion or squirting machine, the combination of a metal-receiver, a plunger having a continuous reciprocating action working in connection with the open end of said receiver, a bar of metal adapted to be moved or fed over the open mouth of the receiver, and wire cleaning means adapted to act on the surface of said metal bar as it is moved or fed forward to the machine.

763,574. PREPARATION OF SALTS OF IRON FOR USE IN OIL-COLORS.—Raymond Vidal, Paris, France. A process for the preparation of an iron-pigment which is immediately suitable to be utilized in oil-color without requiring an intermediary grinding, said process consisting in treating nitrated aromatic compounds by a mixture of iron filings and a solution of sulphate of iron, filtering the basic sulphates of iron, mixed with oxide of iron, obtained by the said treatment, moderately heating the said basic sulphates of iron at a temperature not high enough to produce calcination of the same, and allowing the impalpable powder obtained by the said heating to cool.

763,612. PORTABLE APPARATUS FOR THAWING FROZEN GROUND.—Charles W. Joynt, Seattle, Wash. A thawing apparatus, comprising a fire-chamber perforate in its lower portion, a detachable cover for the fire-chamber, and a depending flaring hood formed of connectible sections, means to connect the hood-sections, and means to detachably secure the upper portion of the hood on the fire-chamber.



763,612.

763,621. ADJUSTING DEVICE FOR OIL-WELL PUMPING APPARATUS.—Franklin P. Myers, Trail Run, Ohio. A device consisting of the combination of a polish-rod, a grip, and means for attaching the same to the polish-rod, a threaded socket formed in the said grip, a short section of tubing engaging with said socket, a sleeve attached to the tube, and means to attach the device to the walking-beam.

763,634. MACHINE FOR FORMING BUILDING-BLOCKS.—William Raab, Waterloo, Iowa, assignor to Thomas Cascaden, Jr., Waterloo, Iowa. In a machine for forming hollow building-blocks, the combination of a mold-box comprising a bottom wall, and expansible side walls, abutments arranged to hold said side walls in closed position, a core arranged to extend through an opening in said bottom wall when said side walls are held in closed position, a shifter arranged to effect a relative movement between said mold and core to simultaneously release said side walls and remove the core from the molded block, and springs extending between said shifter and said side walls for automatically expanding said walls.

763,639. GRATE FOR PULVERIZING-MACHINES.—August Schoellhorn and Herman S. Al-

brecht, St. Louis, Mo. The combination of a grate formed with slots inclined from each side toward the middle in the direction of travel of the material, and a revolving beater mounted above the grate.

763,662. APPARATUS FOR USE IN CERTAIN PROCESSES OF EXTRACTING SULPHIDES FROM ORES.—Guillaume D. Delprat, Broken Hill, New South Wales, Australia, assignor to Broken Hill Proprietary Company, Limited, Melbourne, Victoria, Australia. In an ore-concentrating apparatus in which the concentrates are floated to the top of a body of liquid, a pan having an inclined perforate bottom down which the ore slides, means to feed liquid to the pan, a sump at the lower edge of the bottom for tailings, a discharge for concentrates at the liquid-level of the pan, a baffle-plate between the sump and pan extending from the discharge to near the lower edge of the inclined bottom to maintain a quiescent body of liquid in the sump and at the same time maintain a flow of liquid from the pan through the discharge.

763,665. EXPLOSIVE COMPOUND.—Charles M. Hall, Niagara Falls, N. Y. An explosive compound, consisting of a finely-divided brittle alloy containing aluminum and a heavier metal, and nitrate of ammonium.

763,666. EXPLOSIVE COMPOUND.—Charles M. Hall, Niagara Falls, N. Y. An explosive compound containing silicon in an oxidizable condition and an oxidizing agent.

763,679. MOLD FOR ARTIFICIAL STONE.—Albert Lake, Washington, D. C. The combination with a molding-floor, of a fixed central partition, knockdown side partitions and end boards, means on the end boards to take behind and hold the two farthest side partitions in molding position, and means to lock the end boards to the partitions.

763,675. EXPLOSIVE.—Wassiliy Kirssanoff, Taganrog, Russia, assignor to Société en Actions Promethée, Moscow, Russia. An explosive consisting of the following constituents: potassium chlorate ($KClO_3$), 70 per cent; potassium permanganate, ($KMnO_4$,) 20 per cent; total, 90 parts, by weight; turpentine, ($C_{10}H_{16}$), 9 per cent; carbolic acid, (C_6H_6O,) 1 per cent; total, 10 parts, by weight.

763,685. CEMENT DERIVED FROM ASHES AND METHOD OF MAKING SAME.—Mark W. Marsden, Philadelphia, Pa. A process which consists in comminuting coal ashes, mixing the same with pulverized lime, calcining the mixture, and thereafter reducing it to a powdered state.

763,703. MINE TRAP-DOOR.—John Wack, Canton, Ohio. A door-frame consisting of two sections hinged together, the upper section hinged at its upper edge and the lower section hinged to the bottom of the upper section, door-posts having oppositely inclined faces upon their door sides, and mechanism adapted to open and close the door.

763,746. COMPOSITION OF MATTER FOR CEMENT.—Andrew L. Ginter, Newark, N. J. A composition of matter for producing a cement consisting of a mixture of prince metallic, japan, varnish, coal-tar, white lead, naphtha and an oil.

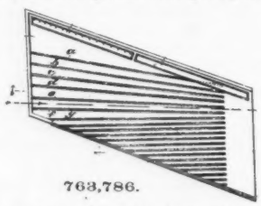
763,749. PROCESS OF EFFECTING THE SEPARATION OF MINERALS.—George A. Goyder and Edward Laughton, Adelaide, South Australia, Australia. In a method of separating minerals and extracting some of them as concentrates, the steps of moving the ore in a finely-divided state in a solution which by the production of gas causes certain of the minerals contained in said ore to rise; and deflecting and guiding them as they rise.

763,783. CONCENTRATING-TABLE.—Gustave A. Overstrom, Anaconda, Mont. A concentrating-table, in combination with means for imparting a reciprocatory movement thereto, said table having an unobstructed tailings-delivery edge, said edge being inclined away from the line of reciprocatory movement from the head end of the table toward the opposite end thereof, and riffles arranged in diagonal relation with respect to said table.

763,784. CONCENTRATING-TABLE.—Gustave A. Overstrom, Anaconda, Mont., assignor to Overstrom Concentrator Company, Butte, Mont. An ore-concentrating table having an open discharge end, riffles arranged upon the surface of said table and extending toward said open discharge end, each of said riffles having a depressed portion and elevated or raised portions on each side of the depressed portion, the depressed portion being formed therein between the ends of the riffles, and means for reciprocating said table in the direction of the length of said riffles.

763,785. ACTUATING MECHANISM FOR CONCENTRATING-TABLES.—Gustave A. Overstrom, Anaconda, Mont., assignor to Overstrom Concentrator Company, Butte, Mont. The combination with a drive-shaft having a crank, a pitman journaled at one end upon said crank, connections between the free end of said pitman and the part to be actuated, and a rocker pivotally mounted and forming a movable fulcrum for said pitman at a point between its journal-bearing and the free end thereof.

763,786. ORE-CONCENTRATING TABLE.—Gustave A. Overstrom, Anaconda, Mont., assignor to the Overstrom Concentrator Company, Butte, Mont. A concentrating-table of substantially diamond shape in outline, and having riffles arranged upon the upper



763,786.

surface of such table said riffles extending diagonally with respect to the table and being of diminishing height in the direction of the length thereof, and terminating upon a smooth or unriffled portion of the table-surface in a line substantially at right angles to the length of said riffles, and means for imparting reciprocatory movements to the table in the direction of the length of the riffles.

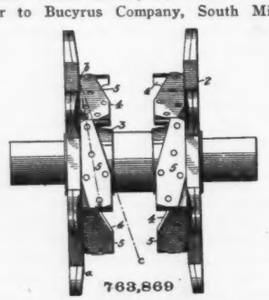
763,787. ORE-CONCENTRATING TABLE.—Gustave A. Overstrom, Chicago, Ill., assignor to Overstrom Concentrator Company, Butte, Mont., a corporation of Montana. The combination with an ore-concentrating table and a feed-box, of riffles arranged on the upper surface of the table that portion of the riffles lying opposite to and to an extent equal to the length of the feed-box increasing in height from the head end toward the foot end thereof.

763,792. APPARATUS FOR SEPARATING CLAY OR OTHER INSOLUBLE MATERIALS.—Maurice W. Phillips, Philadelphia, Pa., assignor to the Pennsylvania Clay Company. In a screening apparatus, a screen of fine mesh, a feeder of capacity to constantly feed material suspended in liquid in quantity in excess of the ability of the screen-meshes to pass the same, a chamber having said screen for one of its walls and otherwise closed and a discharge-conduit of sufficiently small capacity to permit the material passing through the screen to create suction and thereby cause an excess of atmospheric pressure against the material upon the screen.

763,824. WELL-DRILLING MACHINE.—Hugh H. Wilburn, North Yakima, Wash. In a well-drilling machine, a walking-beam of triangular form, a carrier to which the walking-beam is pivoted, and means for causing vertical movements of said walking-beam.

763,847. HEATING-FURNACE.—Charles W. Bray, Pittsburg, Pa., assignor to American Sheet & Tin Plate Company, Pittsburg, Pa. A metal-heating furnace, comprising a horizontal rotary carrier, an unobstructed heating-chamber over said carrier, heating means at one side of said carrier, and arranged to deliver products of combustion on the upper side of said carrier, an outlet for waste products of combustion at the opposite side of said carrier, an air-inlet flue, extending through the walls of the furnace to said heating means, and a stack-flue leading from said outlet and arranged adjacent to said air-inlet flue.

763,869. TUMBLER FOR GOLD-DREDGING MACHINES.—Walter Ferris, South Milwaukee, Wis., assignor to Bucyrus Company, South Milwaukee,



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Wis. A tumbler for dredging-machines and the like, comprising oppositely-disposed drum-sections mounted upon a shaft, and symmetrically-formed wearing-plates adapted to be applied to the bearing-surfaces of either drum.

763,859. PROCESS OF SEPARATING CARBON FROM PULVERIZED CARBONACEOUS MATERIALS.—James D. Darling, Philadelphia, Pa. A process of separating carbon from pulverized carbonaceous material, which consists in mixing oil with said material; and flowing water through the mixture and through an obstruction impervious to the commingled oil and carbon but pervious to the water and gangue.

763,892. HEATING FURNACE.—Josef Hirschmann, Pittsburg, Pa., assignor to American Tin Plate Company, Orange, N. J. A continuous metal-heating furnace having feed-in and feed-out openings at opposite ends and internal supporting-ledges, longitudinal water-cooled supporting-bars within the furnace and extending beyond the feed-in opening, and external connections arranged to raise and lower the bars and move them endwise, the bars being so arranged relative to the ledges that the outer metal pieces are pushed through the feed-out opening as the bars move endwise in raised position to carry the other metal pieces forward.

763,896. CONVEYER.—Joseph C. Hoshor, Paterson, N. J. A conveyer-chain composed of offset links, each having link-separators respectively at opposite sides of the offsetting portions.

763,897. CONVEYING DRIVING MECHANISM.—Joseph C. Hoshor, Paterson, N. J. In a conveyer apparatus the combination of a track having yielding compensating supports, a traveling conveyer having travelers riding on the track, and a driving-sprocket arranged at the side of the conveyor opposite the track and having shouldered teeth engaging with members of the conveyer for holding and propelling purposes.

763,919. GAS-GENERATOR. Phillip Meyer, Santa Rosa, Cal. In an apparatus of the character described, the combination of a furnace, a retort therein, a producer secured upon a side of the furnace, said producer comprising an inner and outer shell, and a hollow body within the inner shell.

763,923. METHOD OF SEPARATING CLAY OR OTHER INSOLUBLE MATERIALS.—Maurice W. Phillips, Philadelphia, Pa., assignor to the Pennsylvania Clay Company. A method of treating insoluble materials, which consists in reducing the material to a finely-divided state and suspending the same in liquid, continuously passing the mixture over a screen of mesh sufficiently fine to permit only a portion of the liquid to pass through the same, and passing the same through a vacuum-creating means connected with the screen, whereby such portion as passes through the screen creates an excess of atmospheric pressure upon the face of the screen, and such portion as does not pass through seals said screen against the passage of air.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

Week ending June 18, 1904.

14,295 of 1903. MAGNETIC SEPARATOR.—Edison Ore Milling Syndicate, London. In electro-magnetic separators, the use of electro-magnets having a magnet field of considerably greater width than their poles, thus allowing of the use of comparatively small electro-magnets.

15,849 of 1903. SOLDERING ALUMINUM.—M. Tomellini, Spezzia, Italy. Soldering aluminum by heating the joint with an oxyhydrogen blow-pipe flame and using a soldering alloy of tin and aluminum.

16,067 of 1903. HAND ROCK-DRILL.—C. Bertenburg and C. Christiansen, Gelsenkirchen, Germany. A rotary hand rock-drill, with improved devices for varying the feed, withdrawing the tool from the face, and changing the steels.

20,945 of 1903. DRILL SHARPENER.—W. W. Word, Latrobe, California, U. S. A. A machine for sharpening drill steels, consisting of two hammers at right angles, one for forming the shape of the drill, and the other helping to form the exact shape of the wings, so that the outer edges shall be all in one plane.

8,994 of 1904. BRIQUETTING PYRITE RESIDUES.—U. Wedge, Ardmore, Pennsylvania, U. S. A. Binding together into briquettes purple ore (iron pyrites) out of which copper has been leached, by mixing with sulphate of iron.

SPECIAL CORRESPONDENCE.

San Francisco. June 29.

(From Our Special Correspondent.)

The United States Mint at San Francisco in the fiscal year ending June 20 coined money amounting to $104,628,846, of which $91,213,500 was gold and the balance silver. This is supposed to be the record for any mint in the world for a year. There are now over $100,000,000 in the vaults of the mint, the force has been reduced and salaries have been cut in several departments for the coming fiscal year.

The gravel mines around Smartsville, Yuba county, were very productive in the old days, but when hydraulic mining in that section was interdicted, work had to be stopped on the more extensive mines, and prosperity departed from Smartsville. Now, however, Edward L. Hutchinson, Edward Tisnerot, M. P. Carter, James Viole, J. Castera, N. D. Oswald, H. C. Milsap, Frank Parillat, J. Larimer and E. Dolland, of Los Angeles, have formed the Deer Creek Blue Gravel & Mooney Flat Hydraulic Mining Co., and taken a bond on the famous Excelsior and Campbell gravel mines, intending to obtain permits from the California Debris Association, put up suitable dams, and impound the debris. They are confident that the cañon will serve for a storage place, after the dams are built. There has been little money in drifting these properties, but as the entire banks once yielded well, they should again.

The Anti-Debris Association has been investigating such mines as it has placed under injunction, including the Badger Hill, Red Dog, Omega, Moody and Sargent properties, but found that even the famous old North Bloomfield was drifting, having abandoned hydraulic work. However, at a recent meeting it found consolation in the fact that it is about to begin another suit against the hydraulic miners on the upper Yuba river, and that there was a chance of litigation against men dredging in the river channels. This without any expert investigation whatever, the conclusions being reached by a self-appointed committee which visited the dredging grounds and looked at them when the owners of machines were absent.

In this connection it may be said that there is a constant search for available dredging ground in almost all the upper counties of the State. The latest large tract to be examined is owned by the Hearst estate, near Palermo, Butte county, 6 miles below Oroville, and about 4 miles from the Feather river. This large tract has been cultivated for citrus fruits, and is in the center of an important orange growing region. It is 6 miles below any dredgers now operating near Oroville. Instead of prospecting with Keystone drills the explorers sank shafts and sampled the ground carefully. Milton Grier is in charge of this prospecting work. Should the ground prove sufficiently rich to warrant the outlay, dredges will be built. In the same vicinity are many more orchards and ranches, which might be dredged, though each different tract would have to be prospected to prove its mineral value. Where a company can get $15,000 or $20,000 an acre from gold contents, working several acres yearly, owners are not likely to wait the slow returns of orange growing. Near Redding, Shasta county, dredger men are getting close to the city limits, though nothing within the city limits has yet been bonded for dredging. The Reid farm, on the north side of the Sacramento river, opposite the town, has been bonded, and a Keystone drill is prospecting.

A 5-ft. ledge of $45 ore found at the California-Nevada boundary at Masonic Mountain 10 miles north of Bridgeport, Mono county, has caused considerable local excitement. Many locations have been made within the past month.

The miner's strike at the Midas mine, Harrison Gulch, Shasta county, after lasting many months, has been declared off by the local miners' union. The company had raised wages 25c. per day, and the strike was ended, that the remaining union men in camp might take advantage of the increase. The mine has been working non-union men for some time.

The Superior Court of Shasta county decided in favor of the Great Western Gold Co. against its former manager, J. J. Chambers, in the sum of $40,000 and costs; the company alleged that Chambers has misappropriated $40,000 intrusted to him for purchasing mining properties.

The new camp of Goldfields in Nevada is sending down to the smelters on San Francisco bay large quantities of rich ore; some carload lots carry as high as 40 oz. gold to the ton. Good ore is also coming from Tonopah. Tonopah will soon have a railroad completed when more ore will doubtless come from that and neighboring camps. It will not all come to San Francisco, as the Utah smelter men got the railroad to make the same ore rate for a haul of 800 miles to Salt Lake as for the haul of 400 miles to San Francisco. This is one of those queer things connected with smelters and railroads.

Denver. July 2.

(From Our Special Correspondent.)

Attorney General Miller has completed the return to the writ of habeas corpus in the Moyer case, and will leave in a couple of days for St. Louis, in compliance with the order of Judge Thayer, of the United States Court.

The Cripple Creek district is quiet, and almost all the mines are in operation again. Thirty-four more miners have been deported under a strong guard of militia. The Colorado Springs authorities would not allow them to leave the train, and they were taken to this city, where a large number are at present being cared for by the Federation officials. A number of the deported men have left to seek work elsewhere. Those belonging to the element which is considered undesirable by the Citizens' Alliance at Cripple Creek have now been deported and the probability is that the military will be reduced to a small number before long. When the large Portland mill at Colorado Springs starts work it is said that only non-union men will be employed.

Forty-eight men have been indicted for murder in connection with the Victor riot, and Sheriff Bell has filed information against them in the District Court. Among them are Moyer, Haywood, Parker, Kennison and Davis.

The Independence mine has been closed as far as company work is concerned. Mr. A. C. Beatty, of this city, representing the Venture Corporation, will leave for London in a few days, to perfect plans for leasing the mine in blocks. In the meantime the pumps will be kept going to regulate the flow of water in the lower levels. Mr. C. M. Becker has been appointed manager.

The output of the Cripple Creek district in June, considering the disturbed conditions at the mines and mills, was excellent, the production being 52,700 tons of ore, valued at $1,607,000.

Another lawsuit has been started against the Stratton Estate by Leslie W. Popejoy, who claims one-half of the estate. He brought suit for a similar share in 1897 and claims that the dismissal of the action then was obtained through bribery and fraud. A large amount of Denver property is involved. Popejoy bases his claim on a grubstake contract made with Stratton in 1891.

The trial of the prisoners in the Sun & Moon explosion cases near Idaho Springs is going on at Central City, in the District Court of Gilpin county. J. E. Chandler, former financial secretary of the Miners' Union, of Idaho Springs, was acquitted. The deportation of men from Telluride continues.

The El Paso drainage tunnel, at Cripple Creek, continues to do its work well. Late measurements show that about 6,500 gal. per minute are discharged. Several mines are entirely unwatered and the fall throughout the drainage district averages about 65 ft.

A number of prospectors have lately been drawn toward a new mining camp called Sherrod, on the Colorado & Southern Railroad, just the other side of the Alpine tunnel, on the top of the continental divide, and judging from the ore, the district, which is only a short distance from the Mary Murphy mine at St. Elmo, promises well. A shipment to the smelter will be made in a few days.

The Geo. Leyner Engineering Co., of this city, has just received a large order for machinery to be placed at the entrance of the tunnel, which will unwater the Yankee Girl, Guston and other mines near Ouray.

Col. H. C. Deming, acting State geologist of Pennsylvania, paid this city a visit a few days ago and left for the San Juan country.

The first car of ore, shipped into Denver by the Moffat road, arrived at the Argo smelter yesterday. It was shipped by the Gold Dirt Mining Co., near Rollinsville.

Duluth.

(From Our Special Correspondent.)

It is now estimated by officials of the roads that the two United States Steel Corporation railroads in the Lake region, the Duluth, Missabe & Northern and the Duluth & Iron Range, will move about 1,000,000 tons under last year, when their combined shipment was not far from 11,000,000 gross tons. It was feared a few weeks ago that they would fall 20% short. They are now shipping at a rate better than 10% under the season of 1903. The Great Northern will fall off a trifle more than the other two. A large amount of lake tonnage has been contracted for the season at 70c. a ton from Duluth, 65c. from Marquette and 55c. from Escanaba. This, though it is not relished by vessel-men, is liable to be the season's rate. Other lake rates are very low; wheat from Duluth to Buffalo, for example, is now moving at 1¼c. a bushel, and is very hard to get at that. This freight is equal to 40c. a gross ton on ore, but there are compensating advantages in the way of trimming and dock charges at the lower end of the trip.

The Volunteer mine, near Negaunee, is to resume at once, both in mining and in shipping the 200,000-ton stock of ore that accumulated last year and before. This is good news for that region, for the Volunteer is looked upon as an important property. More than 200 men will be employed. In the same vicinity the Richmond mine, a silicious lean bessemer property, mined open pit, has resumed and will operate all summer. It will make a large product for the season. It is possible that other mines of the same character will be busy this season. Three steam shovels are working at Negaunee, one each at Hartford, Regent and Cambria. Five shovels are loading from stock-piles at Ishpeming.

Salt Lake City. July 1.

(From Our Special Correspondent.)

The creditors of the Majestic Copper Mining & Smelting Co. are about to be paid. William B. Mucklow, of Hartford, Conn., and Jerome C. Smith, of Boston, have been in Utah for the past week conferring with creditors, who have agreed to accept 60% of the total amount of their claims in cash and the balance in 60 days. On the visit of Messrs. Mucklow and Smith to the mines at Milford, recently, the citizens at a mass meeting adopted resolutions pledging their support and co-operation to the shareholders who have saved the company from complete financial ruin. It is planned to reorganize the company under Maine laws as the Majestic Copper Company, the capital stock to be 450,000 shares of the par value of $10 each. The stock of the old company will be exchanged for that of the new on the basis of two shares for one. Twenty-five thousand shares will be set aside as preferred, and 75,000 shares of common stock will be set aside as bonus to be issued to purchasers of bonds and for contingent purposes; the balance is to remain in the treasury. There are 1,800 shareholders in the old company.

Salt Lake City is going to try to secure the permanent headquarters of the American Mining Congress. A delegation of representative business and mining men will go to Portland prepared to offer, among other inducements, suitably situated ground for a building. The delegates will contend that Salt Lake from its central situation, is the logical place for the permanent headquarters.

Spokane. June 30.

(From Our Special Correspondent.)

Jay P. Graves, general manager of the Granby Consolidated Co., vigorously denies the reports that James J. Hill, president of the Great Northern Railway, has acquired control of the Granby, and says that so far as he knows neither Mr. Hill nor J. D. Farrell owns a share of the stock. The company has not considered the proposition of selling to Mr. Hill. The story started at Vancouver.

H. M. Williams, manager of the Panhandle Smelting & Refining Co., organized two years ago to build a lead smelter at Sand Point, Idaho, on Lake Pend d'Oreille, says that the contract for the smelter will be let immediately, and one 250-ton furnace should be running early next year. The company is composed mostly of St. Paul and Minneapolis people, who own the Ponderay Transportation Co., having a line of boats on the lake.

The United States Marble Co., owning green marble quarries at Valley, Stevens county, Wash., is in bad shape and has been placed in the hands of A. C. Shaw, of Spokane, as receiver. The company is incorporated for $2,000,000 in $1 shares. The officers are M. G. Tayley, Reading, Pa., president; Joseph A. White, Spokane, vice-president; C. E. Mitchell, Spokane, secretary and general manager; the trustees are T. H. Greenway, Valley, Wash.; John C. Kleber, Spokane; Charles S. Nims, Cedar Falls, Ia., and George W. White, New York. Manager Mitchell says that the indebtedness is about $100,000. The assets, in addition to the quarry and the machinery, consist of accounts payable, $13,000, and bills receivable, mostly of notes given for treasury stock, $38,000. The plan is to reorganize and reincorporate, with an assessable company. The United States Marble Co. was the first marble company of the State, and it has been looked upon as the leader of the industry. It made fine displays at the Pan-American and the Charleston Expositions.

Toronto. July 2.

(From Our Special Correspondent.)

W. E. H. Carter, of the Provincial Bureau of Mines, now on an official tour through Northern Ontario, reports from Sudbury that the Creighton and Copper Cliff nickel mines of the Canadian Copper Co. are in operation. The former produces from 800 to 900 tons of ore daily, an amount far in excess of that of other working mines. The Canadian Copper Co.'s West smelter was burned down a few days ago, but the new smelting works are nearly ready to start on a large scale. A water power at High Falls on the Spanish river is being developed to work part of the plant. The Mond Nickel Co. is working the North Star nickel mine. The Vermilion mine, from which, besides nickel and copper, gold, platinum, cobalt and silver have been obtained, is again under development after several years' idleness. The Canadian Copper Co. is also developing a mispickel mine at Net lake in the Temagani region. The Massey Station copper mine is installing the Elmore oil concentration process. A small force is at work on the Shakespeare gold mine near Webbwood. Two water powers are being developed to supply the town of Sudbury with electric energy, one by McVittie & Cochrane on the Wahnapitae river and one at Gordon's to the west.

One of the Ontario government diamond drills has been sent to Black Bay on the north shore of Lake Superior, where there are indications of extensive copper deposits.

The Treadgold mining concession in the Yukon has been cancelled by the Dominion government. This franchise, which has given rise to much controversy and excited strong opposition, was granted in 1900 and secured to Mr. Treadgold and his associates a monopoly of the right to take water from the Klondike and surrounding creeks over a very large area and to sell the same to the miners; also the privilege of taking without cost all abandoned mining claims within a specified range of considerable extent. Owing to the strong protests of the miners and the people of the Yukon generally the syndicate was compelled to reduce the proposed charge for water from $1 to 25c. per miner's inch. The matter came up in Parliament and an investigation was ordered. A committee, which included the late B. T. A. Bell, spent six weeks in the Yukon last year, but before the report was prepared Mr. Bell died. The action of the government in cancelling the concession is due to the inability of the syndicate to finance the undertaking in England. It is understood that large amounts of money have been expended in connection with the project, for which the syndicate will no doubt claim to be recouped by the government.

An Ontario charter has been obtained by the Canadian Iron Co., Ltd., with a capital of $2,000,000 and head office at Ottawa. The incorporators are Henry F. Gooderham, Lindley H. Bowerman, Harvey N. Barry, F. R. Dymond and Robert Weir, all of Toronto.

A despatch from London states that Justice Farewell has granted an injunction restraining the directors of the Gold Run Klondike Co. from paying dividends until 14 days after the general meeting, and also ordering the repayment of £25,000 paid to the Credit Canadienne out of the Klondike assets.

The Dominion Coal Co. has issued a circular to shareholders under date of June 27 explaining the reasons for passing the half-yearly dividend. It states that the net earnings for the first five months of the year have been disappointing. A heavy decrease in earnings occurred during the first four months, attributable to bad weather conditions and higher operating expenses. Earnings for May and estimated earnings for June are satisfactory and equal to last year, but not sufficient to warrant the declaration of a dividend on common stock. The property is pronounced in first class condition, the output at present being the largest in its history.

Victoria. June 28.

(From Our Special Correspondent.)

Last week the Richard III Mining Co., of Mount Sicker, paid the final installment due on its property. Since the mine was acquired about $40,000 has been spent in development, and the company is now in a position to ship ore at a profit.

At the Western Fuel Co.'s Harewood mine, at Nanaimo, operations have been suspended—probably permanently. The mine has never been profitably worked, the coal being exceptionally dirty, but the present decision was precipitated by some friction with the miners. It is expected that the Departure Bay colliery will begin shipping before long.

The directors of the Omineca & Peace River Mining Co. have received word that the manager has secured the Ezra Evans hydraulic property in the Omineca district on favorable terms. In Atlin piping has started on Birch creek, while a local syndicate is successfully prospecting the benches at the head waters of O'Donnell river. This territory is outside the known auriferous area.

In the latest report from Slough creek, the statement is made that in the western crosscut, from the south drift (whence has come the richest prospect yet) the water pressure is less than at other points where water has been encountered. A new cross-cut is being driven from the second raise, toward the end of the south drift, which will give drainage, and another point of entry into the gravel. The contention that the water now encountered in the Slough creek workings (in the bed-rock gravel beneath the clay) is storage water, is upheld by the steady decrease of pressure during the wettest season hitherto experienced in Cariboo.

A rich find of galena ore is reported at Salmon river, North Yale, and a number of claims have been staked. At Siwash creek, near Yale, the recently incorporated International Gold Co. is installing six Merrall stamps with quadruple discharge.

In the Lardeau district, work has been resumed on the Triune mine, and preparations are being made to install an aerial tramway. Last week, the Great Western Co.'s new combination silver mill completed a first short run, producing 1,000 oz. of bullion. At Poplar Creek a claim known as the Mother Lode has been bonded; little development work has yet been done on it.

The Mascot claim on Ruth mountain in the Slocan has been bonded for $20,000; the showings are promising. The outlook in the Slocan City division has lately improved; work is to resume on the Howard Fraction, while the Ottawa is producing heavily. It is thought that the completion of the smelter at Marysville will benefit the district, by increasing the demand for "dry" ores.

There is much activity in the Nelson district, Forty-Nine Creek coming rapidly into prominence as a promising free-milling quartz section. One company there, after expending a large sum in development work, is now installing a 50-ton plant, while a San Francisco syndicate has acquired a group of six claims carrying three leads adjoining the May & Jennie mine. The average value of the ore is given as $17 to the ton. Wm. Davys, who worked the Hewitt mine at Silverton, has now leased the Poorman-Granite property on Morning mountain, and has started work.

A syndicate has been formed to work three hydraulic leases at the mouth of Hall creek, near Ymir, and proposes to install immediately a 6-in. centrifugal pump capable of moving from 900 to 1,200 cu. yd. of gravel in 24 hours.

Monterey. June 29.

(From Our Special Correspondent.)

A number of Monterey people are rather elated over the excellent showing of several properties owned principally in this city, among which may be mentioned the Azteca, on Mitre mountain, which continues its steady shipments to the Monterey smelters; the Cabrillas, about half way between Monterey and Saltillo, leased to the Torreon Metallurgical Co., which has paid the seventh monthly dividend of $10,000 Mexican, and the stock, of which is selling for $450 a share; La Cruz del Aire, of Villaldama, which has now paid a third monthly dividend of $3 per share, and the Norias de Bajan, the stock of which is in demand at $740@$750 a share.

This last named property is at Bajan in Chihuahua, and under the management of O. H. Harker, but has temporarily stopped shipping, as it does not intend to suffer from the high smelter charges, and is already discussing plans for a smelter of its own unless more favorable terms may be obtained. The smelter and concentrating plant at Juarez, across the river from El Paso, owned by the Corralitos Company (whose mines are in the Candelario district), which was recently burned, will probably not be rebuilt, for, though only built in 1897, it was closed in 1898 under an agreement entered into with the American Smelting and Refining Co. The Rosario mines of Guadalupe y Calvo, which were held so long under option by Clark, of Montana, are now being worked by the owners, though just at present temporarily closed down while some improvements are being made. A reduction plant is being erected in Guadalupe y Calvo by T. H. McConnell, and a cyanide plant is being erected for the Los Angeles mines at Baborigame. The Central, Bustillos, and Juarez, of Manuel Ramirez, of Santa Eulalia, containing 196 *pertinencias*, have been taken under option by the Mexican Southern Exploration Company, of Belgia, which is represented here by Luis Peliegrini, with Wm. Adams as the engineer, who will make the examinations.

The Terranantes Consolidated Mining Co. has been reorganized under the name of the United States Mining Co., with J. P. Elkins and J. W. Marshall, both of Pennsylvania, as president and manager respectively, and the 600-h. p. electric plant is completed, giving lights and power for hoisting and pumps. It is said that the Guggenheim Exploration Co. has given up its option on the Descubridora, and that the property is being worked by the owners.

The National Metal Co. has taken up considerable ground, by denouncement, near Barranca del Cobre, east of Batopilas. The survey has been ordered for the wagon road, which will cost $60,000 Mexican, of which the states are to stand one-half; this road will run from Minaca to the prosperous camps of Pinos Altos and Concheño. In the last-named Mr. R. B. Hutchinson, manager of the Concheño Mining Co., owned by J. Corrigan and P. McKinney, of Cleveland, Ohio, has just made a rich strike on the company's land, in the form of a 35-ft. vein of gold quartz, that will keep the 300-ton stamp and cyanide mill busy for some time to come. The bullion is shipped to Minaca, and from the two camps of Pinos Altos and Concheño amounts to over $100,000 Mexican per month.

Mr. Hutchinson, of Concheño, who was for a number of years with the Sombrerete Mining Co., has also been down in Oaxaca, making examinations for his Cleveland people, of the Conejo-Blanco, Eureka and Poder de Dios, which are held under option by Messrs. N. H. Emmons and D. B. Smith, who are operating extensively in the Taviche district.

Exchange continues a downward course, dropping during the week from 214 to 213.

Mining stocks were not particularly active. In El Oro Aldebaran brought $48; Dos Estrellas, $2,060; Nacional, $22, and La Union, $50; La Paz, of Matehuala, S. L. P., raised to $176, and Barreno, to $67; Providencia, San Felipe, Gto., $60, and in Pachucah, San Felipe de Jesus, $16; Amistad y Concordia, $81, and San Francisco, $72.

London. June 25.

(From Our Special Correspondent.)

The West Australian mining market continues to be exercised over the case of the Great Boulder Perseverance. Two weeks ago I mentioned that when Bewick, Moreing & Co. took over the management they found that the ore reserves were not as rich as had been figured by those previously in control. Since then, their sampling of the mine has been completed, and their final report shows that the present state of things is far worse than was supposed. They state that on the Lake View lode the reserves amount to 114,000 tons, averaging $14 per ton, while on the Perseverance lode the ore is of so low a grade that they can only vouch for 25,000 tons, averaging $15 per ton. Mr. Ralph Nichols, the manager, had estimated at the end of 1903 that the reserves in these two lodes amounted to over 400,000 tons, averaging $25 per ton. The discrepancy between the two estimates is so great, that a full explanation is due to the shareholders. It is said in the market that, during Mr. Ralph Nichols' six months' leave of absence, which has just terminated, opportunity was taken to gut the mine. There may be something in this, but it is not sufficient to account for the great discrepancy. Then, again, it is an undoubted fact that, as the Perseverance lode was stoped, it was found that the ore behind was not equal in value to the parts that had been sampled, and that the "exposure-on-three-sides" method of estimating ore gave deceptive results in this case. On the other hand, no one who knows Mr. Nichols would dream of associating his name with incapacity or conspiracy. A full explanation of the circumstances has been despatched by him to the board of directors, and this is awaited with interest. Personally, I am of the opinion that Mr. Nichols never cared for close estimates of reserves. The discussion in the ENGINEERING AND MINING JOURNAL during recent months on the estimation of ore reserves has shown that many sound American mining men care very little about exact forecasts, or about figuring on the most economical rate of extraction. Probably Mr. Nichols' estimate in the present case was undertaken solely to conform with a system favored by directors and shareholders, knowing perfectly well all the time that such estimates were often unreliable. In any case it should be remembered that it was Mr. Frank Gardner, the chairman and former controller of the company, who blew the loud trumpet in connection with the ore reserves, and not Mr. Nichols himself.

The Great Boulder Perseverance now takes a back seat among West Australian producers. The output is to be considerably reduced and further exploration and development is to be undertaken. It is only just a year since the nominal capital of the company was increased from £175,000 to £1,500,000 by giving eight new shares for each old one. The object of this rearrangement of capital was to make the market quotation more nearly equal to the nominal value of the shares. The old £1 shares were selling at £13 and the dividends for a year and a half had been at the rate of 200%. The new £1 shares were quoted at 50% premium for a time, but are now at about 12s. What they will sink to during the next few days remains to be seen. Probably the greatest sufferer by this fall is Sir Christopher Furness, the north country shipbuilder, who two years ago bought large blocks of shares at top prices. He must have lost between £50,000 and £100,000 by buying shares in the Copper King of California, another of Mr. Frank Gardner's companies, that came to grief. A year ago Mr. Gardner announced that Sir Christopher had invested largely in Perseverance, and quoted him as a shrewd business man, who knew what he was doing. Experience has shown that Sir Christopher, though an able shipbuilder and marine engineer, has not made a success of speculation in mining shares.

Rather over a year ago I wrote an article that appeared in your pages describing the deposits of natural sulphate of copper at Copaquire, Chile. There has been a great variety of opinion as to the extent of these deposits and the practicability of working them. It is interesting to note, therefore, that Mr. Louis Campbell-Johnston, the chairman of the company owning the property, and a mining engineer of experience, has come to the conclusion, after a very careful and prolonged examination, that the deposits are decidedly worth working. As will be remembered, the difficulties to be overcome were the scarcity of water and fuel, the great cost of transport due to the remoteness and altitude of the district, and the irregularity of the deposits. Mr. Campbell-Johnston first obtained a supply of water, and then devised a plant in which the sulphate could be separated from the solution and from the other soluble salts by crystallization, using the heat of the sun for evaporation. The crystals thus obtained are being shipped down to Iquique and their quality is now being tested. In the course of a few months I hope to be able to give definite figures with regard to the results. It may be mentioned that the company owns also some copper mines nearer the coast. These Mr. Campbell-Johnston has inspected, and the prospects appear so promising that a railroad is being built to connect with the Autofagasta railway. Particulars of this deposit I hope to send you later on.

Perth. May 23.

(From Our Special Correspondent.)

Kalgoorlie.—The rich run of ore known as the Brownhill shoot has been cut into at the 1,000-ft. level in the Associated ground, not far from the boundary. For some feet the ore averaged over 4 oz. gold per ton, but the latest assays from truck samples are as high as 12 oz. As soon as the cross-cut connects with the workings in the Oroya north block, it is intended to follow the shoot deeper. This famous run of ore has now been followed no less than 3,200 ft. from where it was first found outcropping on the Brownhill lease. Up to date it has yielded about £2,600,000, and on a fair estimate there is ore worth £2,250,000 still in sight in the leases, through which it has been followed to the Associated ground.

A return made by the Mines Department shows the work being done by the State batteries.. In five districts 144 leases out of a total of 343 were regularly sending ore to the batteries.

The following were the principal returns for April:

	Tons.	Oz. fine.
Golden Horseshoe	13,602	17,016
Great Boulder	9,400	13,294
Oroya-Brownhill	7,952	12,455
Boulder Perseverance	10,780	11,720
Ivanhoe	14,412	11,048
Associated	7,007	6,054
Lake View Consols	9,102	4,218
Kalgurli	4,590	4,159
Associated Northern	2,466	2,792
Great Fingall Consolidated	13,300	12,094
Sons of Gwalia	8,680	5,260
Westralia Mt. Morgans	6,470	4,224
Cosmopolitan	8,140	4,022

Sydney. May 14.

(From Our Special Correspondent.)

Victoria.—The Victoria Quartz Mining Co., Bendigo, is now working at a depth of 3,947 ft. The gold purchased during April by banks at Bendigo and Eaglehawk was 21,095 oz., the highest for some years past. The Victoria United, at Ballarat, during the last half-year crushed 13,307 tons for 4,157 oz. gold. The Great Southern mine, at Rutherglen, in the same time treated 7,432 fathoms of dirt for 6,485 oz. of gold—£25,942.

The Victorian April gold yield was 64,143 oz. fine, and for the four months of the year 233,602 oz., an increase of 10,081 oz. over the four months of 1903.

Tasmania.—The Mount Lyell Mining Co. has paid the first dividend since consolidation of 1s. 3d. per share, totalling £75,000. During April the company's smelting works treated 27,597 tons of ore, and the converters produced 637 tons of blister copper, containing, copper, 629 tons; silver, 68,017 oz.; gold, 1,790 oz.

During April the various Tasmanian gold mines crushed 3,681 tons of ore for 3,796 oz. gold. The Tasmanian mineral exports for April were valued at £164,768.

Queensland.—The tin ore mined in Queensland during the first quarter showed an increase in value of £11,052. The Queensland gold yield for April was 54,106 oz. fine—£229,803. During April the Queen Cross Reef at Charters Towers cleaned up three times; 3,720 tons were put through for 10,218 oz. gold and residues worth 1,500 oz.—a total of 12,700 oz., worth £44,000, giving a profit of nearly £40,000. Notable April crushings were: Band of Hope, 180 tons for 340 oz.; Day Dawn, 774 tons for 812 oz.; New Queen, 678 tons for 624 oz., and £344 from cyanide. Queen Cross, 1,304 tons for 3,667 oz. gold.

Auckland. June 8.

(From Our Special Correspondent.)

Gold and Silver Exports.—During May New Zealand exported 61,325 crude oz. gold, valued at £234,241 ($1,171,205), and 111,477 oz. silver, valued at £11,316 ($56,580). For the five months the gold export totalled 211,367 oz., valued at £806,030 ($4,030,195), an increase of about 10 per cent on the corresponding figures for 1903.

Gold Dredging.—The dredging industry in Southern New Zealand continues rather quiet. The Molyneux river has fallen sufficiently to allow most of the dredges working in the gorge claims to make another start, but the drift (loose stones, gravel, etc., carried down the river by its powerful current), has been troublesome, and consequently the returns have been rather moderate. On the whole, however, the yield of gold so far shows an increase not only over last year, but also over the corresponding period of the record year 1902. During the last four weeks the returns won by the Otago dredges total 7,257 oz., or a weekly average per dredge reporting of 32 oz.

Hauraki Goldfield.—During the past month or two several new finds have been reported on this field, notably at Whangamata, Kerikeri (near Thames), and Owharoa (near Waihi). The value of these discoveries has, however, yet to be ascertained. Waihi is now, by reason of the large output from the Waihi mine, by far the most important mining center in New Zealand. The outlook in the Grand Junction and Waihi Extended mines is promising. At the 500-ft. level in the Grand Junction the lode has been followed for fully 1,000 ft., and is stated to be of payable quality the whole distance. The ore is from 5 to 20 ft. thick. This lode has been traced to a point near the Waihi Extended boundary, and if it continues will very shortly be intersected by a drift now being driven. At the Thames, diamond boring has been prosecuted lately with some vigor, but nothing of any value seems to have been met, the bores having intersected only a few small lodes of low-grade quartz. The Victoria Gold Mining Co.'s borehole is down 1,018 ft., the Kuranui-Caledonian Gold Mining Co.'s borehole 1,280 ft., and that bored in the Thames Improvement Co.'s ground 1,202 ft.

The chief bullion returns from the Hauraki field during May are: Waihi—£52,462 ($262,310) from 21,022 tons (equal to $12 per ton); Talisman Consolidated—£8.197 ($40,985), from 3,920 tons (equal to $10.05 per ton; working expenses were equal to $6.60 per ton); New Zealand Crown—£3,480 ($17,400), from 2,383 tons; Komata Reefs—£2,525 ($12,625) from 1,200 tons; Tairua Broken Hills—£1,114 ($5,570) from 600 tons.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and be of any service to them that they can.

TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodations in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. S. Dene has returned to England from India.

Mr. Auguste Mathez has left New York to go to Butte, Montana.

Mr. E. Graham Price, of Kalgoorlie, is on a visit to London.

Mr. Hudson H. Nicholson is at Sumpter, Ore., for the summer.

Mr. Arthur Dickinson, of London, is examining mines in Norway.

Dr. E. H. Cook left New York on his return to Boulder, Colo., on July 2.

Mr. Samuel I. Silverman, of Hadley, Alaska, has been at Spokane, Wash.

Mr. Geo. J. Bancroft, of Denver, is at Quatsino Sound, in British Columbia.

Mr. Richard Pearce is spending the summer at Weybridge, on the Thames, England.

Mr. Geo. F. Woodward, Moctezuma, Sonora, Mex., is visiting Los Angeles, California.

Mr. C. W. Goodale, of Butte City, Mont., is spending a few days at the World's Fair.

Mr. Ferdinand Dietzsch, of London, is examining the Giant mine, at Rossland, B. C.

Mr. J. Parke Channing has returned from a tour to the copper centers of the West.

Mr. Brainard Avery, of New Orleans, secretary of the Balsas Mining Co., is in Mexico.

Mr. Henry F. Lefevre has been examining the Lluvia de Oro mines in Chihuahua, Mexico.

Mr. W. A. Prichard is expected in New York on his way from Kalgoorlie to London.

Mr. C. L. Dignowity, of Boston, is looking after his mining interests in El Oro, Mexico.

Mr. A. H. Elftman, of Minneapolis, is on a visit to Hill City, S. D., and Silverton, Colo.

Mr. Otto Herrmann, of the Teziutlan Copper Co., Teziutlan, Puebla, Mex., is in New York city.

Mr. J. F. Johnston, of Parral, Mexico, is spending a few days at the World's Fair, St. Louis.

Mr. H. A. J. Wilkens, of the New Jersey Zinc Co., is visiting the World's Fair at St. Louis.

Mr. J. Parke Channing recently visited the copper-smelting plants at Butte and Anaconda, Montana.

Mr. Forbes Rickard, of Denver, is on a mine examination trip to Arizona, which will require two weeks.

Mr. Lee Hanchett is at Salt Lake City, where he will act as financial manager for Mr. Samuel Newhouse.

Mr. Willard F. Snyder, manager of the Western Exploration Co., at Salt Lake, has returned from Chicago.

Mr. A. B. Cousin is general manager of the Galice Consolidated Mining Co., in Josephine county, Oregon.

Mr. N. C. Pettit, president of the American Mining & Exploration Co., of Mexico, is at Waldo, Florida.

Mr. A. B. Frenzel, of Denver, has gone to Arizona and New Mexico, to examine deposits of rare minerals.

Mr. D. W. Brunton, who has been consulting engineer of the Anaconda Copper Mining Co., has resigned.

Mr. Wm. B. Fisher, of San Francisco, has returned from the Tonopah and Goldfield districts, in Nevada.

Mr. Harold Jeans, of the *Iron and Coal Trades Review*, returned to England by the *Lucania* on July 2.

Mr. Benjamin Tibbey, of Butte and Salt Lake City, is at the Carrizal Gold Mining Co. properties in Mexico.

Mr. Frank Lewis Nason is examining mines in the vicinity of Richmond, Va. He will be in Virginia a month.

Mr. J. Cleveland Haas has returned to Spokane, Wash., from a month's trip to Goldfield and Tonopah, Nevada.

Messrs. F. F. Simonds and E. Z. Burns, of the firm of Simonds & Wainright, of New York, left on July 5 for Colorado.

Mr. E. E. Abercrombie, a director of the Boston Consolidated Co., has returned East from a visit to Salt Lake city.

Mr. Ernest Du Bois, general manager for the MacArthur Forrest cyanide process in Mexico, is on a trip to the United States.

Mr. John Dern, president of the Consolidated Mercur Co., attended the annual meeting of stockholders at Jersey City on July 5.

Mr. Isaac Woodbury, of San Francisco, is in charge of the Woodbury concentrator exhibit, in the Gulch at the St. Louis World's Fair.

Mr. Chas. Colcock Jones has returned to Salt Lake City from northern California and proceeds shortly to examine mines in Idaho.

Mr. George M. Greene has resigned as chemist with the Boston & Montana Copper & Silver Mining Co. at Great Falls, Montana.

Mr. James Duane has resigned as superintendent of the Pulaski and Crozer furnaces of Virginia Iron and Coke Co., at Virginia, Tennessee.

Mr. O. Bergstrom, who for 15 years was chief chemist and metallurgist at the Colorado smelter at Butte, has opened an office at Butte, Montana.

Mr. Elias S. Gatch, secretary of the Granby Mining & Smelting Co., has gone to Europe, and will investigate zinc methods in Belgium and Germany.

Mr. L. W. Trumbull has accepted the chair of mining engineering and geology at the University of Wyoming, a position left vacant by the death of Dr. Wilbur C. Knight last July.

Mr. Foster Hewett, of the Pittsburg Testing Laboratory, is examining properties near Marysvale, Utah, for Pittsburg people, and will spend a week in the vicinity of Bisbee, Arizona.

Mr. C. H. Gordon, who has been acting professor of geology in the Washington State University during the past year, has accepted a call to the chair of geology in the New Mexico School of Mines.

Mr. Gardner S. Williams, professor of experimental hydraulics in charge of the hydraulic laboratory of Cornell University, has been appointed to the chair in engineering at the University of Michigan, made vacant by the death last Fall of Chas. E. Greene.

Mr. Geo. A. Tweedy, consulting mining engineer and chemist, recently superintendent of the Boston quicksilver mine at Knoxville, California, has opened an office at No. 376 Wilcox building, Los Angeles. Mr. Tweedy was for a time on the staff of the State Mining Bureau as field assistant.

Mr. C. W. Leavitt, Jr., who temporarily assumed control of the business of C. W. Leavitt & Co., of New York, upon the death of Mr. C. W. Leavitt last February, finds it impossible to devote his attention to business, on account of his private engineering practice, and has, on July 1, retired from the firm.

OBITUARY.

I. A. Finch, president of the Finch Manufacturing Co., of Scranton, Pa., died June 28 in New York City. He was 67 years old.

Carlos D. Sheldon died at Houghton, Mich., on June 23, aged 63 years. He was largely interested in the copper and iron mines of northern Michigan.

Thomas H. Cole died at San Francisco July 1. Mr. Cole was one of the pioneers into Nevada. He was president of the Bullion, Waller and Julia mining companies, and was largely interested in the mining interests of Virginia City.

Joseph R. Ryan died at St. Louis, July 1, of pneumonia. Mr. Ryan was superintendent of the principal properties constituting the Bonanza group, at Virginia City, Nev., of which the Consolidated California & Virginia was the most important. Mr. Ryan had been superintendent of this mine for the past five or six years. He was first made superintendent of the Hale & Norcross mine about 10 years ago, and other principal mines in Virginia were later turned over to him.

Capt. Henry Chappell Aspinwall, widely known as a smokeless powder expert, died on June 21 in the Post-Graduate Hospital in New York City. He was born in Epsom, Surrey, in 1855, and came to this country when a young man. He devoted himself to the improvement of explosives for military purposes, and at his death was superintendent of the smokeless powder department of the Dupont Powder Co. Capt. Aspinwall was a member of the American Chemical Society, the Society of Chemical Industry and the Chemists' and the Army and Navy Clubs in New York City. He was also vice-president of the New York section of the Verein Deutscher Chemiker.

SOCIETIES AND TECHNICAL SCHOOLS.

THOMAS S. CLARKSON MEMORIAL SCHOOL OF TECHNOLOGY.—At the graduating exercises of this school, on June 17, there were two candidates for the bachelor of science degree in civil engineering and one for the bachelor of science degree in chemical engineering.

MONTANA STATE SCHOOL OF MINES.—A company of students in charge of Prof. E. U. MacDonald is spending six weeks in the Coeur d'Alene district, Idaho. The students will give some time to surveying work, being required to make mine maps. They will also study mining and milling methods.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—The programme for the summer season meetings of this society has been issued. Work has been outlined by the chemical, mechanical and structural sections of the society. The engineers intend to have a building of their own.

AMERICAN CHEMICAL SOCIETY.—At the recent meeting at Providence, R. I., a long list of papers was presented, and the attendance was good. Among the papers were: 'The Carbon from Acetylene, the Fourth Allotropic Form of Carbon,' William G. Mixter, of Yale; 'Some Experiments on the Fuel Value of Coal Ashes,' Henry Fay, of the Institute of Technology; 'The Action of Water and Some Solutions on the Phosphates of Calcium,' F. K. Cameron and Atherton Seidell, of the Department of Agriculture; 'The Solubility of Calcium Sulphate in Solutions of Nitrates,' Atherton Seidell and J. G. Smith, of the Department of Agriculture; 'The Disinfection of Public Water Supplies,' George A. Soper, of New York; 'Relation of Chemical Disinfectants to Hygiene and Sanitation,' William Dreyfus, of New York; 'The Colorimetric Estimation of Magnesium,' Oswald Schreiner, of the Bureau of Soils, and W. S. Ferris, of Concord, N. C.; 'The Colorimetric Estimation of Phosphates,' second method, Oswald Schreiner and B. E. Brown, of the Bureau of Soils; device for reading 'Nesslerized' Ammonia tubes in water analysis, by W. P. Mason, of Rensselaer Polytechnic Institute, and 'A Peculiar Occurrence of Bitumen and Evidence as to Its Origin,' by William Conger Morgan, University of California.

INDUSTRIAL.

The Lackawanna Steel Co. has practically completed its new structural steel mill at Buffalo and expects to begin the manufacture of structural material by July 1. The company is now making about 1,200 tons of steel rails a day.

The Pioneer Boiler & Machine Works, of Los Angeles, Cal., is completing a contract embracing a generating plant with 15 tanks for the Los Angeles Gas Co. This company is also constructing a water jacket smelting plant for the Fletcher Mining Co. at Headles, California.

At a recent meeting of the stockholders of the Brown Corliss Engine Co., of Corliss, Wis., the stockholders voted to increase the working capital $150,000. The company has one of the most modern shops in the country, and with the increased capitalization will be able to increase its business materially.

George B. Newton & Co., of Philadelphia, miners and shippers of bituminous coal, have given notice that on July 1 the mining and wholesale business, heretofore controlled and conducted by them, will be transferred to and thereafter operated by Madeira, Hill & Co., now of New York, but hereafter operating in Philadelphia also. Madeira, Hill & Co., into which the company will be merged, will retain the same officers.

Following the retirement on July 1 of C. W. Leavitt, Jr., from the firm of C. W. Leavitt of New York the business will be continued under the same firm name and with the same amount of capital as heretofore. Mr. W. F. B. Leavitt, second son of the late C. W. Leavitt, and Mr. C. D. Robb, both of whom have been connected with the firm for several years, will assume the control and management of the business.

The Canadian Rand Drill Company, of Sherbrooke, Que., has closed a contract with the Canadian Westinghouse Co., of Hamilton, Ont., for the installation of a Rand-Corliss compound, power-driven air compressor. This machine is designed to furnish air for various pneumatic appliances and is to be driven by a Westinghouse motor, through a Morse chain drive. The International Coal & Coke Co., Coleman, Alberta, has just placed an order with the Canadian Rand Drill Co. for a 300-h. p., steam-driven, Rand duplex compressor of the latest type.

The Seamless Rolled Steel Pipe Co., of Philadelphia, which has issued a prospectus, is formed under the laws of Delaware with a capital of $800,000 for the purpose of erecting a plant to manufacture seamless steel pipe. This plant will be at Chester, Pa. The officers are: President, E. C. Kent; general manager, Wm. H. Green, Jr.; treasurer, John Roberts; secretary, Edward J. Altemus. The directors are: Wm. C. Sproul, E. C. Kent, J. K. Shoemaker, Wm. H. Green, Jr.; John Roberts, Edward J. Altemus, Wm. F. Bartlett and Ralph C. Lupton.

A large No. 3 Cross Oil Filter manufactured by the Burt Manufacturing Co., of Akron, O., has been installed in the horse-power plant at the St. Louis Exposition. Besides the filter used by the exposition authorities, the Cross oil filter has also been ordered by the C. H. Bradley, Jr., Co., of Pittsburg, for use in connection with its exhibit at the fair. The Buckeye Engine Co., of Salem, O., and the De Laval Steam Turbine Co., of Trenton, N. J., have ordered No. 3 American filters to be used for the same purpose.

The Crocker-Wheeler Co., of Ampere, N. J., says that the equipment of factories with electric motors for individual and group drive of machine tools has become such an extensive department of its business that it is now prepared to give its clients expert advice upon the latest ideas and results in shop practice, in addition to purely engineering advice upon the design and installation of electrical apparatus for shop equipment. To this end the company has retained the firm of Dodge & Day, modernizing engineers, of Philadelphia, and places the services of this firm at the gratuitous disposal of its customers. The company says that while the economies that may be effected by electric drive are conceded by all, the actual savings accomplished depend entirely upon the intelligence with which the apparatus is selected, installed and used.

TRADE CATALOGUES.

The B. F. Sturtevant Co., of Boston, Mass., issues a leaflet announcing the removal of its entire plant to Hyde Park.

An illustrated catalogue of tangential waterwheels is issued by the Abner Doble Co., of San Francisco. There are illustrations of water wheels, housings, bearings and nozzles.

A map of the S. K. C. system of Long Distance Transmission in California, issued by the Stanley Electric Manufacturing Co., is an interesting presentation of the great transmission system of the Pacific Coast.

The Joseph Dixon Crucible Co., of Jersey City, N. J., in a small booklet entitled 'Oil vs. Grease Lubrication,' set forth the advantages to be derived from the use of Dixon's graphite greases as lubricants for machinery.

In an attractive catalogue the Magnolia Metal Co., of New York City, embodies information in regard to the use and application of anti-friction metals. Illustrations of the company's plant and machinery add to the interest of the book.

The Chicago Pneumatic Tool Co. has prepared a comprehensive catalogue of its air compressors. There is an illustration of its plant at Franklin, Pa., and many cuts of complete compressors and their parts. Price lists and careful descriptions add to the practical value of this catalogue.

Peculiarly timely at this season is the small booklet entitled 'Yellowstone Park,' issued by the Northern Pacific Railway. As its title indicates, the subject is the marvellous Wonderland of the West, and the excellently executed colored pictures included add to the interest of the text. There are also useful works and time tables for the convenience of prospective travelers to that region.

In the second supplement to catalogue No. 77 Arthur Koppel, of New York, announces that he has arranged with the Baldwin Locomotive Works of Philadelphia to furnish Baldwin locomotives of all classes and sizes for any gauge, narrow as well as standard, and for all kinds of motive power, steam, electricity or compressed air. The catalogue contains cuts of locomotives for industrial purposes.

GENERAL MINING NEWS.

ARIZONA.

COCHISE COUNTY.

(*From Our Special Correspondent.*)

The weather is very hot and there is much suffering among cattle, as there has been no rain since July, 1903. The recent epidemic of typhus fever at Bisbee is about over, and it is probably safe for Eastern and Northern men to come here.

Copper Glance.—At this property southeast of Bisbee, No. 2 drill hole stoped at 1,500 ft., the last 680 ft. being in a hard lime and iron formation. It was decided to try to find a contact between the lime and porphyry between No. 2 hole and the shaft. No. 1 hole at the shaft went down nearly 1,500 ft. in conglomerate.

Copper Queen.—No. 5 furnace of the smelter at Bisbee is being dismantled, and will not be blown in again. This is the first step toward the wrecking of the Bisbee plant. No. 5 was the largest of the furnaces and was capable of treating over 250 tons of ore per day.

CALIFORNIA.

AMADOR COUNTY.

Big Elephant Hydraulic.—The clean-up on this property will take place in the latter part of July, as the water season will end about that time.

Climax.—Grading for the hoist at this mine is completed, and the mill is crushing about 20 tons daily. A 10-stamp mill is to be erected.

Keystone and Others.—The Keystone, Bunker Hill, Central, Eureka, Oneida, Kennedy and Zeila, all mother lode properties, are running full time, day and night.

Liverpool Tunnel.—Several veins and quartz stringers have been cut in this tunnel.

South Eureka.—Operations are temporarily suspended at this mine, Sutter creek, and the mill is idle.

CALAVERAS COUNTY.

Alpine.—This mine at Washington Ranch, has been bonded to Los Angeles men, and a 300-ft. tunnel is to be run.

Black Oak.—A 3-ft. ledge of good ore has been struck in this mine at Altaville.

Boston.—This mine, formerly the Esperanza, at Mokelumne Hill, is to be started up soon.

Del Monte.—In this mine, at Jesus Maria, the mill is kept steadily at work on good ore.

Gaston Hill.—At this mine, El Dorado, sinking is being done, and a mill is contemplated.

EL DORADO COUNTY.

De Metre.—New machinery is being put on this mine, near Georgetown, and a small mill is to be put up. A double compartment shaft is being sunk.

Eureka.—At this mine, W. E. Everson, superintendent, the old shaft has been cleaned out and retimbered to water-level. New and heavier machinery will be installed.

FRESNO COUNTY.

Coalinga Oil Field.—During May 10 oil wells were finished in this field, averaging 3,000 bbl. daily. The month's pumping yielded 400,000 bbl., not including the new wells—a new record.

INYO COUNTY.

Key Note.—A mill is to be erected at this group of mines, at Beveridge.

LOS ANGELES COUNTY.

Castiac Mining Water & Power Co.—This company has been organized in Los Angeles to open several thousand acres of placer ground 10 miles north of Newhall, on the Santa Barbara branch of the Southern Pacific Railroad. The officers are: E. T. Wright, president; W. W. Jenkins, vice-president; Franklin Munger, secretary, and John Spiers, treasurer.

MARIPOSA COUNTY.

Golden Harvest Mining Co.—Fine ore has been uncovered in one of this group of nine claims, five miles north of Coulterville. James C. Henderson is superintendent.

Malvina.—This mine, at Coulterville, which has been idle some time, has been taken by New York men. The tunnel is being repaired. James Quinn is superintendent.

NEVADA COUNTY.

Union Gold Mining Co.—This company has been organized to work the old Union mines on Banner Hill, near Nevada City. The 274-ft. 3-compartment shaft is to be cleaned out and retimbered and modern machinery put up. Geo. A. Nihell is superintendent. The mine has been idle some time because of litigation.

SAN LUIS OBISPO COUNTY.

Cinnabar.—Los Angeles men have bonded from E. S. Rigdon this quicksilver mine, near Cambria.

SANTA BARBARA COUNTY.

Santa Maria Oil Field.—There are now 33 producing wells in this field and 30 more wells are being bored.

YUBA COUNTY.

Casey Farm.—A Keystone drill has commenced prospecting on this property. It is part of the 1,200 acres of dredging ground bonded to the English syndicate.

COLORADO.

BOULDER COUNTY.

American Smelting & Refining Co.—It is reported that this company contemplates erecting a $250,000 smelter plant at Boulder.

Belle.—A 10-in. streak of rich gold ore has been opened up at this mine at Salina.

Boulder Gorge Mining, Milling & Power Co.—This company, capitalized at $3,000,000, has purchased from Francesca C. Teal the Teal property at Sugar Loaf, on which the Sphinx mine is located. The stated price is $150,000. New machinery is to be installed, and the ore will be treated by the cyanide process.

CLEAR CREEK COUNTY.

Buffalo-St. Louis Mining Co.—This company is to resume operations on its Golconda group of mines on Fall river at once, after an idleness of nearly three years. A 6-drill Rand imperial compressor has been installed.

Whiting Mining & Milling Co.—This company has erected a 100-ton milling plant on its Terrible mine at Silver Plume.

Stevens.—The mill at this mine at Silver Plume has been enlarged to 100 tons capacity.

GRAND COUNTY.

Happy Dream Mining & Milling Co.—This company has secured a large acreage, reported to show strong veins of copper, near Kremmling.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Big Chief.—Shipments were steady during June, and 300 tons of lead ore running 30% lead and 1,000 tons of iron carrying 50% excess and 5% lead have been sent to the smelter.

Bon Air.—Good ore is shipped regularly from this shaft on the Wood fraction.

Coronado.—Sinking has started in this shaft to lessen the flow of water at the Penrose.

Little Johnny.—A number of lessees are at work at No. 2 shaft and several are shipping steadily. The company is working at the 1,300-ft. level and shipping considerable copper ore.

La Plata.—This mine, on Rock hill, is shipping 50 tons a day of lead carbonate ore. Considerable prospect work is being carried on from the lower levels.

Little Union Gulch.—In this gulch, south of Iowa, C. H. Tessey has opened 15 ft. of lead carbonate ore at a depth of 55 ft. The ore runs 30% lead, 7 oz. silver and a trace in gold.

Ollie Reed.—The owners have started a shaft in the flat and put up a new gallows frame and boilers. When the hoist arrives sinking will start. The new shaft will catch the ore-shoot opened by the upper shaft.

Penrose.—Sinking has started, and the shaft will go down 250 ft. to the sulphide zone that was opened by the diamond drill. The flow of water is heavy, but the pumps have been able to handle it easily.

SAN MIGUEL COUNTY.

(*From Our Special Correspondent.*)

Smuggler-Union Mining Co.—These big mines in Marshall basin, which for the past 20 years have been operated almost continuously, were closed down on June 30 by order of Bulkeley Wells, president and general manager, and on July 2 the portion of the company's two mills, two miles above Telluride, treating Smuggler-Union ore, was also shut down. The cessation of operations is due to the inability of the management, owing to the existence of the strike of the miners and mill men in the Telluride district, and the ensuing lawlessness, to secure a sufficient number of experienced miners to work the mines properly. Since the strike started last September only a part of one of the company's mills has been running on Smuggler-Union ore. About 200 men lost their positions in consequence of the shut down, but most of the miners have already employment on the Tomboy and Liberty Bell mines, and comparatively few of them will leave the district. It is currently reported that the larger part of the properties will be leased to responsible persons, and that in the course of a few weeks the mines will probably be employing more than when they closed. It is said that the Smuggler-Union must be operated on an extensive scale to get the best results, and that the ore must be mined and treated at a nominal figure with few interruptions. Manager Wells has issued a statement with reference to the shut down. So far as known none of the other big mines in the Telluride district will close. The management of the Liberty Bell Gold Mining Co. and of the Tomboy Gold Mines Co. deny that anything of the kind is contemplated.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Strike Situation.—Mining is going on as usual, martial law is still in force, and everything is quiet. A coroner's jury found members of the Western Federation of Miners guilty of the murders at Victor on June 6. The men captured in the union hall were found guilty of rioting and conspiracy in the murders. Moyer Haywood and other members of the executive committee of the Federation were declared guilty of inciting the crimes.

Stratton's Independence, Ltd.—This property is to cease work on company account and the workings are to be leased. This step has been rumored for some months. Some time ago work was abandoned below the 900-ft. level and the pumps pulled. The ground will be leased in small blocks, and undoubtedly a large number of men will be employed on the various leases. It is understood that the royalties will be graded according to the value of the ore and that they will be let as soon as possible.

IDAHO.

LEMHI COUNTY.

Gold Stone.—This mine and 10-stamp mill at the head of Pratt creek, owned by the Climax Mining Co., are under bond to Chicago and Colorado people. Richard Gies, of Great Falls, Mont., owns a two-thirds' interest.

Haidee.—This property, near Leesburg, has cut the lead in the main tunnel it is driving under the management of Cary Wright. It is said the ore where cut has a value of $20.

OWYHEE COUNTY.

Addie.—At this mine at Silver City a favorable showing of high-grade gold ore in addition to good bodies of milling ore is reported.

SHOSHONE COUNTY.

Burke Mining Co.—This company at Wallace, has completed the installation of 400 ft. of air pipe and a fan.

Gold Hill.—This new mining district is in the southern part of the county. William E. Parry is the deputy mining recorder. It is in the Clearwater country, in the Black Lead section.

WASHINGTON COUNTY.

(*From Our Special Correspondent.*)

The Seven Devils Camp, which has been so long held back by lack of transportation or smelter facilities, is taking on new life this season because of the plans of the Ladd Metals Co. (of Portland, Ore.,) to erect a custom smelter convenient to the several properties opened up. A site has been slected at Landore, ground has been broken and work will be pushed as rapidly as possible. The adjacent properties can readily furnish it with from $75,000 to $100,000 worth of ore monthly, and with the erection of a cable train (for which survey has already been made) the Peacock and other properties on the north side of the mountain can continue deliveries all winter. The pit of the smelter is well selected. The Decorah and Arkansaw are immediately adjoining and delivery from the Blue Jacket and Alaska can be made from tram-cars. There is abundance of wood and water and the site adjoins the surveyed terminal of the Pacific & Idaho Northern Railroad, which is now partially graded from its present terminal at Council. A number of claims will be patented this season and great activity is noticeable throughout the camp. W. H. Adams has charge of the construction of Ladd Metal Co.'s furnace, and John Williams, who is manager of the company's two furnaces, will probably have charge of the new furnace also.

ILLINOIS.

SANGAMON COUNTY.

(*From Our Special Correspondent.*)

Cora Coal Co.—This company, which will operate a mine near the village of Cora, 6 miles north of Springfield, has been organized with a capital stock of $40,000. The directors are M. J. Baum, Frank Rutzke, John M. Murphy, Charles Kraft and Joseph Schaeffer, all of Springfield.

Peabody Coal Co.—This company, of Chicago, is shipping coal from the new mine north of Springfield, on the Chicago & Alton Railway, which they started to sink in the spring. This mine is equipped with self-dumping cages, shaker screens, etc., and is to be in every way a modern and up-to-date mine, and they expect their output to be nearly 2,000 tons per day when the mine is fully developed. They have about 1,100 acres of coal right.

INDIANA.

VIGO COUNTY.

Standard Fuel Co.—W. F. Anderson has been appointed receiver for this company, holding coal mining property in this and Clay county, by Judge Kohlsaat.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Copper Shipments.—Stocks of refined copper in this district are very light. Lake vessels have cleaned up nearly all the metal that accumulated on the wharves at the smelters during the strike of the masters and pilots. The Quincy docks are practically bare, as are also the Calumet & Hecla and Dollar Bay wharves. The new Michigan smelter shipped its first copper this week. There is a saving of 1-5 ct. per lb. on mixed lake-and-rail shipments compared to all-rail rates.

COPPER—ONTONAGON COUNTY.

(*From Our Special Correspondent.*)

Mass Consolidated.—Rock shipments to the stamp mill have been increased to 500 tons per day, and the plant is operating day and night. Underground developments continue very favorable.

Victoria.—No. 1 shaft is sinking to the 23d level. Cross-cuts to open the lode are being extended at the 20th and 21st levels. The 19th level cross-cut has penetrated the lode and is being continued to explore the parallel formations lying beyond. The work of installing the new hoist at No. 1 shaft will be started at once.

MINNESOTA.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

Duluth.—This mine, at Biwabik, is not yet shipping, but is cleaning up in preparation therefor. It will not make its usual output of 150,000 tons this year.

Great Northern.—This road is building a branch line to the Monroe mine, of the United States Steel Corporation, that was bought with a traffic clause attached, which gave the traffic to the Great Northern. The Tener shaft, a part of the same mine, though on an adjoining 40 acres, is not under traffic contract, and the Duluth, Missabe & Northern, which is a railway property of the United States Steel, has built thereto a road which also runs to the Monroe.

MONTANA.

CASCADE COUNTY.

Hartly.—The shaft on this mine in the Neihart district is down 300 ft., and high-grade silver ore 3 ft. thick is reported exposed.

Lizzie.—A strike of silver-lead ore is reported at this mine in the Neihart district.

National Park Gold Mining Co.—Officers of this company at Great Falls have been elected for the ensuing year as follows: President, C. F. Murphy; vice-president, C. A. Fitzpatrick; secretary and treasurer, Geo. I. Danks; general manager, David Noble; directors, David Noble, C. F. Murphy, Charles Lochray, G. I. Danks, J. C. Crowley, C. A. Fitzpatrick and A. E. Canfield.

DEERLODGE COUNTY.

Tuxedo and Saturn.—These quartz lode claims, at Anaconda, have been purchased by W. D. Clark from William Brown. The claims are silver-lead producers.

LEWIS AND CLARKE COUNTY.

South Fork Gold Mining Co.—This company has secured 10 claims on Ford creek, 20 miles southwest of Augusta and 80 miles from Great Falls. Development of the properties is to begin at once.

PARK COUNTY.

Emigrant Gulch Consolidated Placer Mines Co.—This company has been financed by George S. Gandy and Frank Weckerly, of Philadelphia, and machinery is now being shipped in expectation of starting operations about August 15. About 800 acres of placer ground is controlled by the company.

NEVADA.

ELKO COUNTY.

Nelson.—It is reported that this property at Mountain City will be purchased from Russell, Pedder & Co., by Captain De Lamar.

ORMSBY COUNTY.

Longfellow Mill & Mining Co.—A good strike of gold ore in a recently uncovered 18-in. vein is reported at this mine at Red Cañon.

WHITE PINE COUNTY.

Giroux.—These properties, near Ely, are, it is said, to be equipped with a smelter. D. N. Harper, the promoter, has secured bonds on all the properties lying between the Giroux and Copper Flat mines.

NEW MEXICO.

GRANT COUNTY.

Comanche.—A machine shop and foundry have been purchased for the new smelter at this mine at Silver City.

Imperial Mining & Smelting Co.—This company will work the mines of Christian Yaeger in the Shakespeare district.

LINCOLN COUNTY.

Jicarilla Mining & Reduction Co.—This company has started the excavation for its concentrator in Jicarilla. Shafting for a 100-ton plant will be put in.

NORTH CAROLINA.

CHATHAM COUNTY.

Chatham Coal & Iron Co.—The holdings of this company, at Cumnock, have been purchased by Samuel A. Henzsey. The property consists of 2,700 acres, with outstanding first mortgage bonds against it amounting to $60,000. The price paid was $30,000.

OREGON.

BAKER COUNTY.

Carpenter Hill.—This group, 18 miles northwest of Baker City, has been taken over by the Albert Creighton Co., a New York corporation.

Virtue Mines Development Co.—This company has been incorporated to take over the Virtue property near Baker City. The incorporators are S. L. Baker, J. K. Romig and C. A. Johns.

JOSEPHINE COUNTY.

Red Bean.—A body of ore carrying high values is reported uncovered at this mine at Starveout Creek, near Grant's Pass.

Oro Fino.—The machinery formerly used to operate the defunct Darnell mine, at Kalama, Wash., has been installed at this property, about 7 miles from Grant's Pass.

PENNSYLVANIA.

ANTHRACITE COAL.

Carroll D. Wright, umpire of the Conciliation Board, has sustained the contention of the United Mine Workers that the Temple Iron Co., the Scranton Coal Co. and other companies should withhold from the pay of all the men employed about the collieries the amount of wages due the check weighman and check docking bosses. The companies, however, have the right to insist on an assignment from each miner and to discharge men for refusing to make such assignment.

Clear Springs Coal Co.—This company, at Pittston, is laying foundations for a new washery.

Prospect.—At this breaker of the Lehigh Valley Coal Co., near Wilkes-Barre, 4,558 gross tons of coal were recently loaded and shipped in a 9-hour day. This probably breaks all records for the anthracite region.

Susquehanna Coal Co.—It is announced that this company has placed an order for 200 steel mine cars. Though several bituminous coal mining companies in Pennsylvania are using steel cars this is said to be the first experiment at the anthracite mines. Surveys have been made and other preparations completed to increase the capacity of the storage yards at McClellan, near Millersburg, by 170,000 tons. This makes the total capacity of the plant 380,000 tons, the largest single storage plant yet erected. With the addition of three piles with a capacity of 60,000 tons, there will be eight 25,000, two 30,000 and two 60,000-ton piles. Work on the contemplated addition to the capacity of the yards will be started in a few weeks. Each table covers a circle nearly 200 ft. in diameter, and the coal is loaded and dumped by machinery, large trusses, over 100 ft. high and reloaders on large circular tracks, doing the work. It will require several months to complete the job.

Troy Coal Co.—This company has leased 250 acres of land at Wilkesbarre. It will operate the old Hutchins breaker, in which new machinery has been installed.

Warrior Run.—This colliery, below Ashley, operated for nearly 50 years by A. J. Davis, of Wilkes-Barre, has been purchased by the Lehigh Valley Coal Co. The colliery, owing largely to Mr. Davis' excellent judgment, has yielded good profits. Mr. Davis is probably the last of the old generation of independent operators in the Wyoming region, and the transfer of the property is notable for that reason.

BITUMINOUS COAL.

Ellis-Blum Coal Co.—The property of this company in Butler county, consisting of 400 acres of coal land, has been purchased for $65,000 by a company of Pittsburg men.

Penn.—This mine, at Greensburg, has been abandoned. It has been operated for 33 years, and has produced 12,000,000 tons of coal. It is the oldest mine in the Irwin district.

Washington County Coal Co.—This company, of which M. N. Marquis, of Newcastle, is president, now owns about 1,200 acres of coal land on the line of the Wabash railroad near Patterson's mills, in Washington county, within 22 miles of Pittsburg.

SOUTH DAKOTA.

CUSTER COUNTY.

(*From Our Special Correspondent.*)

Clara Belle Mining Co.—At the annual meeting of this company these officers were elected: Frank Hebert, Custer, president; F. A. Gira, Custer, vice-president; Charles Hebert, Custer, treasurer; Laura N. Hebert, Custer, secretary. A small cyanide plant will be built to treat the tailings from the mill.

Empire Group.—Machinery has arrived for these claims on Spring creek. A shaft is to be sunk 100 feet.

Inter State Mining Co.—At this company's property a shaft is down 20 ft. on an 18-ft. vein.

Saginaw Mining Co.—Work will begin at the Saginaw mine, at Custer. Bonds to the amount of $150,000 have been issued.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Commonwealth Mining Co.—This company has recently been organized to develop a tract of ground adjoining the Globe mine, near Lead.

Diamond Group.—Ohio people have purchased 190 acres of ground adjoining the Lucky Strike for $25,000. Development work is in progress.

Michigan Gold Mining Co.—At the annual meeting of this company J. B. Mars, Deadwood, was elected president; Edward Hanschka, Deadwood, vice-president; John Baker, Deadwood, secretary and treasurer.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Black Eagle.—The 10-stamp mill will soon be completed.

Cochran.—The Huntington mill will start this month. The vertical ore body has been encountered again. A year ago the property was bonded to eastern men, but was abandoned. The owner has run a cross-cut and found the vein.

Golden West.—A flume is being built from Castle creek to the mine. A 200-ton stamp mill is contemplated.

Gopher Mining Co.—A. D. Arundel and A. H. Elfton, of Minneapolis, are working the Gopher mine, 4 miles north of Hill City.

TENNESSEE.

CAMPBELL COUNTY.

La Folette Coal, Iron & Railway Co.—At a recent meeting the stockholders decided to spend $1,000,000 in enlarging and improving properties. The company will construct additional coke ovens and mine more coal. It has coal, iron and limestone on lands surrounding its furnace at LaFollette. John E. Searles has retired from the presidency, and H. M. LaFollette, the founder of the enterprise, is president. The directors and principal stockholders are Boston men.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Settlements.—The settlements reported by Salt Lake banks during the week ending July 1 aggregated $460,700, of which the sum of $246,000 was paid for base bullion.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Beaver-Harrison.—The working force is soon to be increased. Manager Trenam has issued an encouraging report to stockholders. While no high grade ore of consequence has been found, the present development makes a good showing of milling ore.

Newhouse Mines & Smelters Corporation.—Several hundred men are busy and work is being pushed rapidly on the new concentrator and other buildings. Graders are extending the line of the San Pedro road from Frisco to Newhouse. The company is also working on its two-mile line, which will connect the mine and mill.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Daly-Judge.—Prospecting at this property is progressing favorably. Energy is centered on the 1,200 and 1,400-ft. levels.

Ontario.—The management has purchased from the Daly Mining Co. the hoisting plant at shaft No. 2, which is being moved to Ontario shaft No. 3, where it will replace the plant recently destroyed by fire. The machinery is practically as good as new.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Honerine Mill.—The new sampling plant is being constructed and the treatment of custom ores will start shortly.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—Shipments for the week ending June 25 were: Granby, 12,180 tons; Mother Lode, 3,104 tons; Emma, 759 tons; Oro Denoro, 396 tons; No. 37, 32 tons. Total shipments for the week, 14,371 tons. Total for the year to date, 396,461 tons.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—Ore shipments for the week ending June 25 were: Le Roi, 1,220 tons; War Eagle, 1,280 tons; Centre Star, 1,440 tons; Le Roi No. 2, 310 tons; Le Roi No. 2, milled, 250 tons; Spitzee, 30 tons; Kootenay, 380 tons; Jumbo, 220 tons. Total tons, 5,240. Year to date, 177,528.

MINING STOCKS.

(Full quotations given on pages 46 and 47.)

New York. July 6.

The Saturday-until-Tuesday celebration of Independence Day by the exchanges was welcomed by the weary brokers, whose orders are mostly of the "wait for a spurt" class. It seems, judging by the dullness prevalent, that the contraction in stock speculation has not yet reached an end, and, say the better informed, it is a question if trading will again be active until after Election. Of course, certain specialties will show animation intermittently through the support of their "rounders," but the stock market as a whole cannot be expected to recover until the public are inclined to invest. Until then the brokers may take their annual holidays conveniently.

Amalgamated Copper shows small sales at $48.875@$51.125, and Anaconda around $18.75. Montreal & Boston, of British Columbia, awaits the deposit of proxies August 1, favoring the consolidation plan.

Phoenix of Arizona is in demand, and sales have been made at 22@26c. Iron Silver, of Colorado, re-appeared at $1.85. Comstock shares show a little recovery, Ophir rising to $3.15, and Mexican to $1.10.

Boston. July 5.

(From Our Special Correspondent.)

The volume of business in mining stocks has fallen off somewhat, yet the tone to the list is particularly encouraging. A few stocks have shown spasmodic activity during the week, and most of them show net advances during the period. Utah Consolidated was taken in hand to-day and recovered a $1.50 advance to $37.87½ ex-dividend. The orders are thought to have come from New York again. United States mining has also been conspicuous, touching $21.87½. The directors have declared an initial dividend of 50c. a share, which is expected to be paid quarterly, although not so announced. The directors announce that the $430,000 floating debt has been retired by the $500,000 6% debenture bond issue made lately. It has been decided to pay for the lead smelter from earnings, and already the sum of $100,000 has been spent from this source. Net earnings are running between $90,000 and $100,000 per month.

Winona has been in request, touching $7.12½ on buying said to come from the Lake district. Bingham was active early last week up to $24.62½, but has subsided. The mines in this camp are well thought of and interest at the present time centers in them. Centennial has been quiet around $20@20.75. The second instalment of $2 on the $4 assessment called is payable July 12. Osceola has advanced $1, to $61, on light trading. Tamarack has advanced $4, to $91, although it is a foregone conclusion that no dividend will be declared at this time.

Dominion Coal, which touched $40, has recovered to $43, while the preferred is off to $104. Allouez has advanced $1.37½ to $8.75 on confident buying by people who believe that the property is bound to be a paying one in time. No action has yet been taken relative to listing Greene Consolidated on this exchange.

Colorado Springs. July 2.

(From Our Special Correspondent.)

The production for the month of June was considerably in excess of what was expected. In spite of the fact that most of the mines were closed down for a time after the Independence explosion, and with the Portland closed over half the month, the production reached the satisfactory total of $1,607,000. The camp, from a mining standpoint, is in excellent shape, and with the labor troubles apparently over, it is expected that it will show marked improvement from now on.

El Paso closed a fraction higher than last week, selling for 85¾c. Vindicator sold for 61½c. Elkton closed at 67⅞c. bid, 68⅝c. asked. Portland was $1.60 bid, $1.72½ asked. C. K. & N. quotation was 32⅛@34¼c. per share.

San Francisco. June 30.

(From Our Special Correspondent.)

Dealing in the Comstocks has been somewhat more active, and prices better. Next week will be a broken week, and traders are apparently anxious to get in all the business they can before then.

Some quotations noted are: Ophir, $3@$3.05; Consolidated California & Virginia, $1@$1.10; Mexican, $1@$1.05; Caledonia, 60c.; Gould & Curry, 20c.; Potosi, 13c.; Challar, 10c. per share.

On the San Francisco & Tonopah exchange business was fairly active, and values quite steady. Some large blocks of stocks were taken. Montana Tonopah brought $2.50; Tonopah Belmont, 77c.; Tonopah Midway, 62c.; Tonopah North Star, 34c.; Rescue, 8c. per share. One lot, 100 shares, Tonopah of Nevada, was sold at $8.25 per share.

On the California exchange dealing in oil stocks was quiet, though there was very little change in prices. Union Oil sold at $59; Kern, $4.50; Reed Crude, $1.50; Occidental, 7c. per share.

COAL TRADE REVIEW.

New York, July 6.

ANTHRACITE.

The anthracite coal trade has shown little material change during the week; demand is slowly falling off, and along the Atlantic seaboard and in Chicago territory the market is now dull. Most of the mines were shut down for nearly a week on account of the Fourth of July holiday, and production was thus curtailed to a considerable extent. However, there was a large output during June, and as the general situation does not favor any increase in demand before the coming of cool weather production will probably diminish until September. Retail trade all over the country is light, and in many markets sales agents have been more concerned with arranging vacations than with selling coal.

A considerable tonnage is arriving at docks on upper lake ports, and some coal is going to inland yards, but the demand for it has not been heavy since the first of the month. In Chicago territory the market is now quiet. Coal is arriving by lake and docks are accumulating supplies. It does not appear that those consumers who in past years have bought their coal in July and August will this year act differently, although the slack market may cause them to wait. Some coal is coming in all-rail: the demand for it is light. Along the lower lakes and in Canadian territory conditions are more quiet; a considerable tonnage is going to Canadian points by the canals, but in general demand has fallen. Along the Atlantic seaboard little interest is shown by dealers or consumers. At most points the market is only fair, and at some, particularly New York harbor, it is dull. The steam sizes continue to sell slowly owing to the large offerings of bituminous at low prices, and the general falling off in industrial activity. There is little prospect of the demand for these sizes increasing in the near future.

BITUMINOUS.

The Atlantic seaboard bituminous trade has changed very little since the last report. Some of the special grades are in a little better demand, and the tonnages of these going forward have slightly increased. In general, however, the market continues dull. Prices continue low, the poorest grades of Clearfield selling for 70@75c. per ton at the mines, with gas slack as low as 35@40c.; better grades of coal command higher prices.

In the far East the trade is actually dull, but, comparatively speaking, it is calling for a fair tonnage, a little more than a few weeks ago, and there are signs of the demand increasing. Along Long Island sound demand has improved slightly, though not as much as to the eastward. At New York harbor points the market is very quiet, in fact almost lifeless. The all-rail trade has shown no improvement during the week.

Transportation from the mines to tidewater continues good. In the coastwise vessel market, vessels are in plentiful supply. Freight rates continue on the basis of 75c. from Philadelphia to Long Island sound, and 85c. to Boston, Portland and Salem.

Birmingham. July 4.

(From Our Special Correspondent.)

The suspension of work on the part of United Mine Workers of America in this State at mines where companies decline to make a contract with the miners at the wage desired by them, will affect the aggregate output of the State. The miners offered practically to renew last year's contract, that is a sliding base contract, the average selling price of pig iron being considered, with the minimum mining wage, 47½c., and the maximum at 57½c. per ton. The furnace operators in this State, the Woodward Iron Co. excepted, made a counter proposition to the miners, also offering a sliding contract, based on the average selling price of pig iron, ranging from 40 to 55c. per ton for mining. The miners appointed a committee to discuss the wage scale with a like committee of the operators, and this joint committee is still holding meetings. However, the old contract expired June 30, and there was a general suspension of work. A number of commercial coal operators, those who produce coal not used in the manufacture of coke or pig iron, signed temporary contracts with the miners' organization, to continue operation under the old contract, and when the new contract is made they will adopt the same.

A large number of mines in Alabama are worked with non-union men; almost all of the mines in Walker county. Three or four mines are operated with convict labor. So, with those mines in operation with a temporary contract, the non-union mines and the convict mines, there is still a large coal production.

The production during the month of June was heavy. The furnace companies loaded railroad cars, all kinds of bins and stock-piles, so as to be prepared for the suspension. Some of the customers of the coal companies in this district also took additional coal last month, fearing that the miners' organization would not permit the commercial coal operators to make a contract, as was done.

There are no indications of disturbances in the coal-fields. The leaders of the miners have advised against any violation of the law. As far as can be learned no steps are to be taken looking to the filling of places of the men out, until all negotiations looking to a settlement have failed. The operators claim that they cannot renew last year's contract, which was the result of an arbitration which was presided over by Judge Grey, of Delaware.

Chicago. July 4.

(From Our Special Correspondent.)

Wholesale and retail trade alike are dull in anthracite and are expected to become duller with the advent of another month lessening the discount from the list price by 10c. Leading dealers say they expect dulness in the trade from now until the coming of cold weather again. The carriage of anthracite by lake is large, but is threatened with a division of vessels to more profitable traffic, in default of profitable cargoes east-bound. There is the usual complaint about the condition of the river and the blocking of deep-draft boats by the tunnels, and this year the situation is worse than ever, in view of the growth of coal-carrying vessels in size. All-rail business has diminished greatly and can hardly revive this season.

In the bituminous field the greatest business is being done in supplying threshing coals. The demand for these is heavy and increasing, with the probability that it will be greater than in any previous year. In steam coals the market may be summarized by saying that the demand for western low-priced grades is steady and for eastern grades light. Run-of-mine from Indiana and Illinois mines brings $1.40@$1.90 and screenings $1.30@$1.70. Smokeless is holding well up to circular and is apparently growing slowly but surely in popular favor; the efforts of the city smoke department to have it used in the city are helping its sale; quotations are $2.80@$3.15. Hocking is in steady and good demand for the season, with little surplus coal on track, and the price varying but slightly from $3. Youghiogheny and Pittsburg are in better demand, selling for $3@$3.10.

Contracts just let by the Board of Education for the school year ending June 30, 1905, give some idea of the prospect as dealers see it for the coming year. The awards were by years, for five districts, each district representing approximately 12,000 tons of bituminous coal a year. Prices were as follows, on the successful bids, the lowest in each case: District 1, Alwart Bros., Williamson county coal, $2.79; district No. 2, Anthracite-Bituminous Coal Co., Williamson county coal, $2.79; district No. 3, Baker Bros., Vigo county coal, $2.75; district No. 4, Busse-Reynolds Coal Co., Williamson county coal, $2.78; district No. 5, City Fuel Co., Williamson county coal, $2.91. On anthracite coal, by districts in the same fashion, the prices bid were $6.75@$7.10 for grate and $7@$7.75 for egg, on a basis of 2,000 tons average delivery to each of the five districts.

Cleveland. July 5.

(From Our Special Correspondent.)

There is a lassitude in the market which is hard to explain. The coal trade has seldom been more destitute of activity than it is at the present time. The market is feeling the effects of the holiday. The shipments by lake have been eased off, as boats are not moving on the two holidays and the lake docks machinery is not in operation. In addition the mines suspended activity for a while. This affected the coal situation, stopping the free movement which has prevailed heretofore. The market also eased up on the demand for steam coal. Prices are 90@95c. at the mines, for both Ohio and Pennsylvania coal. The current demand for coke is easier also, as furnaces are going out of blast. Some contracts for delivery during the ensuing six months are now being made. Others have been withheld for the time being and a few are being made for three months. Prices hold at about $2@$2.10 for 72-hour foundry coke, and $1.50 for good furnace coke.

Pittsburg. July 5.

(From Our Special Correspondent.)

Coal.—There is but little change in the coal markets. All of the mines in the Pittsburg district closed for the Fourth, and many of them are still idle to-day, as is invariably the case after a holiday; but a general resumption is expected to-morrow. Shipments to the lake ports continue heavy, but the local trade is dull and lower prices seem to prevail. Run-of-mine coal is quoted at $1@$1.10 a ton at the mine.

Connellsville Coke.—The active list of ovens is down to about 60%, over 2,000 ovens having been blown out last week. Quotations remain at $1.40@$1.50 for furnace and $1.80@$2 for foundry coke. The production for the week was 160,375 tons, a decrease of 26,750 tons compared with the previous week. The shipments aggregated 7,305 cars, distributed as follows: To Pittsburg and river points, 2,450 cars; to points west of Pittsburg, 3,715 cars; to points east of Everson, 1,140 cars. This was a decrease of 85 cars.

San Francisco. June 30.

(From Our Special Correspondent.)

No change in trade is noted. Supplies are generally good, of all sorts.

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountains coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is nominal at $14 for Pennsylvania anthracite and $13 for Cumberland. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel and $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. July 6.

Exports of coal and coke from the United States for the five months ending May 31 are reported by the Bureau of Statistics of the Department of Commerce and Labor as follows, in tons:

	1903.	1904.	Changes.	
Anthracite	865,372	779,611	D.	85,761
Bituminous	2,048,650	2,146,206	I.	97,556
Total coal	2,914,022	2,925,817	I.	11,795
Coke	167,412	218,690	I.	51,278
Total	3,081,434	3,144,507	I.	63,073

Exports of coke went chiefly to Mexico. The exports of coal were distributed as follows:

	1903.	1904.	Changes.	
Canada	2,193,550	1,960,289	D.	233,261
Mexico	317,499	439,314	I.	121,815
Cuba	185,300	210,909	I.	25,609
Other West Indies	94,881	123,593	I.	28,712
France	401	8,117	I.	7,716
Italy	30,317	40,519	I.	10,202
Other Europe	10,254	18,303	I.	8,049
Other countries	81,820	124,773	I.	42,953
Totals	2,914,022	2,925,817	I.	11,795

The decrease in exports to Canada was due chiefly to interruptions to transportation resulting from severe weather early in the year.

Imports of coal into the United States for the five months ending May 31 are reported as follows:

	1903.	1904.	Changes.	
Canada	836,156	548,493	D.	287,663
Mexico	5	221	I.	216
Great Britain	1,204,216	40,643	D.	1,163,573
Other Europe	356	50	D.	306
Australia	78,261	94,094	I.	15,833
Japan	5,314	18,384	I.	13,070
Other countries	1,019	756	D.	263
Totals	2,125,327	702,641	D.	1,422,686

Of the coal imported this year 14,759 tons were classed as anthracite, the rest being bituminous. The imports this year were chiefly on having returned to its normal small proportions. the Pacific Coast, trade on the Atlantic Coast having returned to its normal small proportions.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of June 25 that the coal market remains in a lethargic state, prices remain unaltered. Quotations are: Best Welsh steam coal, $3.84; seconds, $3.66; thirds, $3.54; dry coals, $3.54; best Monmouthshire, $3.54; seconds, $3.48; best small steam coal, $1.98; seconds, $1.86; other sorts, $1.62.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

There is no improvement to be noted in freights, the market being dull all round. Some rates quoted from Cardiff are: Marseilles, $1.30; Genoa, $1.26; Naples, $1.26; Las Palmas, $1.41; St. Vincent, $1.56; Rio, $2.10; Santos, $2.46; Buenos Aires, $1.74.

IRON TRADE REVIEW.

New York, July 6.

The iron markets are generally dull, and new business is not being placed to any considerable extent. If the present conditions last, there will be a large idle furnace capacity by the end of the month.

The meetings of the various pools in New York this week excite only a moderate interest. It is generally thought that there will be few or no changes made in nominal prices.

The May commerce report shows a large increase in exports. It looks as if the United States Steel Corporation had been doing some work in that direction in a quiet way. The next return will probably show what success its agents abroad have had.

The National Tube Co. has announced a revision of discounts, effective July 1, providing for a reduction from former quotations averaging about $2 a ton. New discounts are as follows, black being mentioned first and galvanized seconds: ⅛ to ⅜-in., 70, 55%; ½-in., 73, 63; ¾ to 3-in., 78½, 68½; 3½ to 6-in., 77, 67; 7 to 12-in., 72½, 57. There was a general reduction effective January 1, and on February 1 an advance of one point was made on all sizes from ⅛ to 6-in. A similar advance was made on March 1. On June 1 a reduction of one point was made on all sizes except from 7 to 12-in. The reduction just announced is one point all around plus an extra discount of one and one-half points on sizes from ¾ to 3-in., and on sizes from 7 to 12-in. the reduction was one and one-half point. It is understood that merchant steel pipe has been selling at the rates now being quoted for some time; are the lowest prices that have prevailed for years.

Exports and Imports.—Exports of iron and steel from the United States in May and the five months ending May 31 are valued as below by the Bureau of Statistics of the Department of Commerce and Labor:

	1903.	1904.	Changes.	
May	$8,330,063	$11,159,712	I.	$2,829,649
Five months	39,608,881	49,301,327	I.	9,692,446

The May exports were the largest reported for some time. The increase for the year was 24.5%. The chief items of exports for the five months were as follows, in long tons:

	1903.	1904.	Changes.	
Pig iron	5,704	19,054	I.	13,350
Bars	18,436	22,350	I.	3,914
Rails	3,262	83,146	I.	79,884
Sheets and plates	7,084	12,698	I.	5,614
Structural steel	12,867	15,362	I.	2,495
Wire	36,014	49,978	I.	13,964
Nails	15,444	17,318	I.	1,874

The most striking increase was in rails. Exports of steel rails in May were 41,388 tons, of which 23,603 tons went to Canada and 10,641 tons to the far East. Exports of iron ore for the five months were 4,026 tons in 1903 and 2,351 tons this year, showing a decrease of 1,675 tons.

Imports of iron and steel into the United States for May and the five months ending May 31 are valued as below:

	1903.	1904.	Changes.	
May	$3,679,821	$1,920,334	D.	$1,759,487
Five months	20,714,973	9,066,915	D.	11,648,058

The decrease for the five months was 56.2% It must be remembered that this comparison is with a year of exceptional activity in the trade. The chief items of imports were, in long tons:

	1903.	1904.	Changes.	
Pig iron	372,577	39,950	D.	332,627
Billets and blooms	145,058	35,345	D.	9,713
Scrap iron and steel	45,253	6,223	D.	39,030
Bars	15,713	7,308	D.	8,405
Wire-rods	7,815	8,090	I.	275
Rails	61,618	23,640	D.	37,978
Tin-plates	22,117	27,717	I.	5,600

Imports of iron for the five months in 1903 were 326,517 tons; this year they were 141,193 tons, showing a decrease of 185,324 tons, or more than one-half.

Imports of manganese ore and oxide into the United States in May were 10,439 tons, against 11,734 tons in May, 1903; showing a decrease of 1,295 tons, or 11.5% this year.

Birmingham. July 4.

(From Our Special Correspondent.)

There is a little improvement in the demand for pig iron and the quotations are looking up. No. 2 foundry iron is firm at $9.25, with $9.50 being asked right along. The sales with some of the companies in this section are equal to the production, with prospects of a continued improvement in the face of prospects of a short iron production.

The iron shipments show no change. There is much iron in the yards in this district, but it is given out that no small amount of it is sold and waiting shipment.

The following quotations are given: No. 1 foundry, $9.50@$10; No. 2 foundry, $9.25@$9.50; No. 3 foundry, $8.75@$9; No. 4 foundry, $8.25@$8.50; gray forge, $8@$8.50; No. 1 soft, $9.50@$10; No. 2 soft, $9.25@$9.50.

There is nothing being done in finished iron and steel hereabouts, all of the rolling mills being shut down now. The Gate City mills (Republic Iron & Steel Company) closed down Saturday evening. It is still rumored hereabouts that if some sort of settlement is made in coal mining the Birmingham mills (Republic Co.), and the Bessemer mills (Tennessee Co.), will resume operation by July under the continuous plan of the Amalgamated Association, which provides for an arbitration for a new wage scale.

Chicago. July 4.

(From Our Special Correspondent.)

The week has been a quiet one as regards sales of pig iron; there is no decided change one way or the other. If one might hazard a guess, it would be that the market will stiffen rather than weaken. Users of iron seem anxious to buy, but possessed of the idea that

prices are going down and that it will therefore be good policy to hold off large purchases as long as possible. So the waiting game continues. The consumer of iron is hopeful of lower and the seller of higher prices; neither shows confidence in present conditions. Southern continues at $9.50@$9.75 Birmingham, or $13.15@13.40 Chicago, for most orders, with perhaps 25c. less on large orders. No official announcement has yet been made about the proposed advance of 20c. on Southern iron; in view of the protests of sellers, it may not be made.

Northern sells for $13.50@$13.75, with a shading not exceeding 25c. on the largest orders. The market, on the whole, is better for northern than for southern, although more southern is being used.

Sales are chiefly of small quantities, not exceeding 5,000 tons, and deliveries remain short—60 to 90 days, with no apparent prospect that the old-time time of six to nine months between order and delivery will become fashionable again.

Coke is a little stronger, with shipments curtailed so as to keep off the track the surplus that has worried dealers for the last month with nightmares of demurrage charges. Connellsville sells for $4.70@$4.80, as last week. The end of the present week will see the market in healthy condition again, if too much is not piled in to anticipate the recovery.

Cleveland. July 5.

(From Our Special Correspondent.)

Iron Ore.—The market has seen a lessening of sales. The reason is that uncertainty has entered anew into the question of prices, with the result that there is a generally lower list of quotations on ore. The lowering tendency has been mostly with the non-bessemer grades. The quotations are now generally at about $2.40 for the non-bessemer Mesabi, with old range ores bringing about $2.50. There is some talk of lower prices for Mesabi ores, but this has brought out no confirmatory advices. Many of the vessel-men, instead of taking the low rates of freight offered by the shippers, have decided to run their boats wild. Both the going and season rates are now about 70c. from the head of the lakes and 55c. from Escanaba.

Pig Iron.—There has been very little activity in pig iron during the past week. Some few of the consumers are talking of buying foundry for the ensuing six months, but in the main they have held off, contenting themselves with merely inquiring for material. The prices have eased again and are now on about the minimum basis of $12 in the Valleys for No. 2 foundry. The situation is so easy as to spot sales and possible contracts for future delivery that many of the furnaces are going out of blast rather than continue to produce iron merely for the purpose of piling it. The situation in bessemer and basic is about as it has been.

Finished Material.—The market has been easier in that respect. The approach of the holidays and the appearance of the first of July have had easing tendencies on everything. This is invoice time and repair season and many concerns are taking advantage of the dullness prevailing to ease up somewhat on the speed of production and to make some repairs which are needed. There is also talk of making opportunity for the adjustment of wage scales generally even among the factory employees.

New York. July 6.

Pig Iron.—The local market continues quiet; sales are small lots for early delivery. For northern iron we quote: No. 1 X foundry, $15; No. 2 X, $13.75@$14.50; No. 2 plain, $13.75@$14.25; gray forge, $13. For southern iron on dock, prices are about as follows: No. 1 foundry, $13.50; No. 2 foundry, $12.75@$13; No. 3 foundry, $12.50.

Plates.—There is no change in market conditions; demand is light. Sheared plates are quoted as follows: Tank, 1.25-in. and heavier, 1.75@1.85c.; flange, 1.85@2c.; marine, 1.95@2.10c.

Bar Iron and Steel.—The market is still quiet. Refined bars are quoted at 1.495c., in large lots, with steel at the same figure. Common iron bars can be had for 1.35c.

Steel Rails.—Quotations remain $28 for standard sections, f. o. b. mills. Light rails are quoted f. o. b. eastern Pennsylvania mills, as follows: 12-lb., $27; 20-lb., 25-lb., 30-lb., and 35-lb., $25; 40-lb. and 45-lb., $24.

Structural Material.—Demand has not improved locally. Large lots at tide-water are still quoted nominally at 1.75@2c. for beams, angles and channels.

Philadelphia. July 6.

(From Our Special Correspondent.)

Pig Iron.—The disemployment of labor throughout this State is having a bad influence. A good many mills have shut down for the usual summer repairing, but this is expected. A good many of our larger plants have very greatly reduced their labor force, notably the Baldwin Locomotive Works. Other concerns along the Delaware have also cut down expenses, and some of them give no signs as to how soon they will resume. The smaller shops hiring from 5 to 50 men are in the main busy, and, so far as appearances go, they will run through July and August all right. Pig iron is not selling at present to any extent. There is talk about blowing out furnaces in eastern and middle Pennsylvania, but no definite statements can be obtained from those who ought to know. Very little iron is being offered on the market simply because the makers had no inducements to offer, having already done their best in the way of low prices. Stocks are accumulating at some furnaces and it will be followed by a stop unless something encouraging develops within the next two or three weeks. Quotations are given at $15@$15.25 for No. 1 X foundry; $14.50 for No. 2 X; $13.75 for No. 2 plain; $13.50 for gray forge; basic, $13.25; Southern No. 2, $13.50.

Merchant Bar.—The mills for the most part are on vacation. Very little iron is moving from stores. The smaller consuming shops are all busy. Quotations are 1:52½ for steel bars.

Billets.—It seems impossible to arrive at an understanding which will make the buyers of billets feel willing to purchase in large quantities. It is understood that the Billet Association will have something to say, but the only thing buyers are waiting on is a big reduction. As to this, billet people say there is no occasion for it and nothing to gain by it.

Sheets.—The sheet trade keeps up better than almost any other branch of finished iron.

Pipes and Tubes.—There is a good demand for tubes, but a very indifferent one for pipes. There is a great deal of work under way which calls for tubes and no concessions are to be had.

Plates.—The only business heard of for a week has been in ¼-in. tank. All other kinds are dull. Boiler steel is quoted at 1.88½ and the boiler-yards keep making a terrific noise, notwithstanding the hot summer.

Structural Material.—Unless our structural mills get some new business very soon, there will be an enforced restriction.

Scrap.—Two or three enterprising scrap-men have made conditional purchases of some large lots of No. 1 steel scrap and No. 1 wrought railroad, and in the meantime they are scouring the country to find out whether they can turn it. Railroad scrap is quoted at $13; No. 1 steel at $11 per ton.

Pittsburg. July 5.

(From Our Special Correspondent.)

The second half of the year opened with the iron and steel market extremely dull in almost every line, but with fair prospects of a revival in trade within the next few months. There is a great deal of business in sight throughout the country, and the Pittsburg district will get a large proportion of it. The Wabash Railroad terminals on the South Side, the large warehouses in that section of the city, the elevated tracks of the Pennsylvania Railroad in Duquesne Way, and the big building to be erected by H. C. Frick will require a heavy tonnage of structural and other iron and steel material, all of which will be produced in the mills here. It is expected that some big contracts soon will be let, and indications point to a general resumption of iron and steel mills after much needed repairs have been completed. A number have been closed for this purpose and most of the works were closed for the Fourth, and urgent repairs were made at some and operations resumed this morning. The plants of the Carnegie Steel Co. are being operated to about 85% of their capacity, and this percentage is likely to be kept up and increased before long. The Homestead works are busy with orders for plates for the Pressed Steel Car Co., which has enough orders on its books to keep its big plant at McKee's Rocks in full operation for several months. Steel railroad ties also are being turned out at Homestead. This is likely to prove an important industry. The company is putting them down on its own railroad, the Pittsburg, Bessemer & Lake Erie, and a number of other roads that have been experimenting with steel ties, it is understood, will soon place some large orders. An official of the company spoke very encouragingly to-day of the future of the steel tie business.

A threatened obstacle to an improvement in trade was removed during the week by the settlement of the wage scale for the year by the Amalgamated Association of Iron, Steel & Tin Workers with the American Sheet & Tin-Plate Co. An adjustment of the wage question with the independent concerns depended entirely upon a settlement with the leading producer. The conference with the Independent Sheet Manufacturers' Association continued for two days and resulted in an agreement, but the signatures to the scale were withheld until the American signed. The conference with the American Co. was renewed on Thursday morning and the sheet and tin-plate scales were signed a few minutes before midnight, when the annual wage agreement expired. Telegrams were sent by the Amalgamated Association to all union mills in the country that they could continue to operate if an agreement was entered into verbally with the men that the scale would be signed as soon as copies were received. Every concession asked for by the American Co. was conceded by the Amalgamated Association except the continuation of the rebate arrangement for tin-plate, definite action being deferred until July 22. The Republic Iron & Steel Co. and the independent iron concerns will continue to operate their plants pending a settlement of the wage scale by a board of conciliation as provided by an agreement entered into two years ago. In the meantime the present scale will continue in force. The same wages that have prevailed in the sheet and tin-plate mills since the conference held in April, a cut of 18% from the original scale for 1903-04, will continue for the year 1904-05. The sheet plant of the American Co. at New Philadelphia has been added to the non-union list.

A number of blast furnaces were closed late last week and, according to reports, it is estimated that fully 70% of the merchant furnaces in the Pittsburg and the Shenango and Mahoning valley districts are idle. A few others may go out of blast before the first of next month, and furnacemen express confidence of a revival as soon as the accumulation of stocks is reduced. Inquiries continue to be received, but few new orders of any consequence are being placed and prices are remarkably low. There is considerable interest here in the series of steel meetings scheduled to be held in New York this week. The Billet Association will meet on Wednesday and the Plate Association on Thursday. Other meetings will then be arranged to suit the members.

Pig Iron.—Several small sales were made during the week, and prices are a shade lower. Bessemer pig iron is quoted at $11.75@$11.90, Valley furnace foundry No. 2 at $12.50@$12.65, Pittsburg, and gray forge at $12@$12.25, Pittsburg. The inquiry of the International Harvester Co. for 30,000 tons of foundry iron has not yet been placed.

Steel.—The market is extremely quiet, and there have been no sales of bessemer or open-

hearth billets. There is no doubt that the association price of $23 is being shaded. Plate prices also are being cut, but quotations continue at 1.60c. and steel bars are still quoted at 1.35c.

Sheets.—While the price for No. 28 gauge black sheets named by the leading producer is 2.20c., it is known that sales have been made as low as 2.10c., and it is reported, but the report is not confirmed, that a large sale was made during the week at 2c. Galvanized sheets range in price from 3.15 to 3.25c.

Ferro-manganese.—The market is unchanged, $41.50 still being quoted for domestic 80% per ton.

Cartagena, Spain. June 18.

(Special Report of Barrington & Holt.)

Iron and Maganiferous Ores.—Trade continues very quiet. The shipments for the week were one cargo, 3,750 tons dry ore, to Great Britain, and one cargo, 1,500 tons manganiferous ore to Marseilles. The outlook is poor, and ores are offered at lower prices.

Current quotations for iron ore are: Ordinary 50% ore, 6s. 3d.@6s. 9d. per ton; special low phosphorus, 6s. 9d.@7s. 6d.; specular ore, 58%, 9s.; magnetic ore, 60%, 10s. 9d. for lumps and 8s. 9d. for smalls. Manganiferous ores range from 9s. 3d. for 35% iron and 12% manganese up to 14s. for 20% iron and 20% manganese.

Pyrites.—Iron pyrites, 40% iron and 43% sulphur, are quoted at 10s., a drop of 3d. per ton. Shipments for the week were 9,170 kg. copper pyrites to Marseilles.

CHEMICAL AND MINERALS.

New York, July 6.

The market is listless, and consumption is only of a hand-to-mouth character, while prices have fluctuated but little.

The foreign trade of the United States in the five months ending May 31 is shown below:

	Imports.	Re-exports.	Entered for Consumption.
Asphalt, tons	48,005	1,372	46,633
Cement, lb.	189,964,051	6,896,737	183,067,314
Chlorate of potash, lb	100,841	3,536	97,305
Clay or earths, tons	101,125	80	101,045
Graphite, tons	9,283	5	9,278
Salt, lb.	165,776,677	246,318	165,530,359
Saltpeter, lb.	5,794,370	430,900	5,363,470
Soda, caustic, lb.	1,563,349	666,765	896,584
Soda, sal, lb.	1,754,509	4,968	1,748,541
Soda, ash, lb.	9,189,472	12,270	9,177,202

Exports of domestic products in the same period of this year and last were:

	1903.	1904.	Changes.
Cement, bbl.	83,172	127,705	I. 44,533
Gunpowder, lb.	393,920	258,052	D. 135,868
Lime, bbl.	28,443	22,519	D. 5,924
Lime, acetate, lb.	23,492,197	26,845,030	I. 3,352,833
Salt, lb.	11,123,653	9,290,191	D. 1,833,462

Imports were chiefly from Germany and Great Britain; exports mostly to the West Indies, Central and South America.

It is interesting to add the imports at New York of the following substances during the five months ending May 31: Aluminum sulphate, 167,466 lb.; ammonium carbonate, 142,924 lb.; ammonium muriate, 652,385 lb.; barium sulphate, 434,704 lb.; cobalt oxide, 28,112 lb.; Fuller's earth, 916 tons; lithophone, 208,997 lb.; mica, 170,092 lb.; ocher, 2,644,100 lb.; potassium carbonate, 2,318,204 lb.; potassium prussiate, 552,714 lb.; sodium nitrite, 44,476 lb.; talc, 2,120,422 lb.; zinc oxide, 923,513 pounds.

Cyanide.—Imports have been small of late, as supplies here are sufficient to meet the demand. Importers quote 19@20c. per lb., f. o. b. New York, but a large consumer will find little difficulty in shading these prices.

Bleaching Powder.—Quotations remain at $1.20@$1.25 per 100 lb. from first hands. Trade is quiet.

Imports of bleaching powder into the United States in the five months ending May 31 were as below, in points:

	1903.	1904.		Changes.
British bleach	39,933,152	25,870,768	D.	14,052,384
Continental	10,414,231	12,663,456	I.	2,249,225
Total	50,347,383	38,534,224	D.	11,813,159
Re-exports	180,340	1,434	D.	178,906
Consumption	50,167,043	38,532,790	D.	11,634,253

The falling off in consumption this year is equal to 23.2%, principally in British bleach.

Copper Sulphate.—There are indications that market prices will continue easy for some time, but it does not appear likely that the fluctuations will be erratic. In fact, considering the centralization of trade, and the comparatively small imports (only 29,731 lb. at New York from January 1 to May 31), prices promise to remain pivoted above $4.50. To-day first hands quote $4.875@$5 per 100 pounds for domestic delivery. Exporters usually quote less, in order to meet competition abroad.

Exports of copper sulphate from the United States in the five months ending May 31 were 22,393,538 lb., showing a marked increase as compared with last year. Shipments were principally to Italy, Austria and South America.

Acids.—Generally speaking, the trade remains quiet, and prices unchanged.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	**Oxalic, com'l.**	$5.10@$5.50
Muriatic, 20°	1.60	**Sulphuric, 50°, bulk, ton**	13.50@14.50
Muriatic, 22°	1.75	**Sulphuric, 60°, 1.05 bulk, ton**	18.00@20.00
Nitric, 36°	4.50	**Sulphuric, 66°, 1.20 bulk, ton**	21.00@22.00
Nitric, 38°	4.75		
Nitric, 40°	5.00		
Nitric, 42°	5.50		

Brimstone.—Best unmixed seconds for shipment are quoted at $21.50@$21.75 per ton, and thirds about 50c. less. In the five months ending May 31 the United States imported 64,752 tons, which is 20,719 tons, or 32% less than last year.

Exports of brimstone from Sicily in May were 62,798 long tons, of which the United States received 13,178 tons (11,528 tons best unmixed seconds, and 1,650 tons thirds). Since January exports have totaled 273,561 tons, an increase over last year, of which the United States took 60,707 tons, or 22.2% (49,207 tons being best unmixed seconds and 11,500 tons thirds).

Stocks in Sicily on May 31 were 279,761 tons, which compare with 289,205 at the same time last year, and 262,292 tons in 1902.

Pyrites.—Prompt deliveries are small outside of a few contract cargoes. Prices are not as strong as they have been, primarily because imports are much smaller than last year and competition has become more aggressive.

We quote domestic pyrites 10@10.5c. per unit for lump ore, f. o. b. Atlantic coast mines, and 9c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 10@12.5c. per unit for lump, and 9@10c. for fines, delivered at Atlantic ports.

Imports of pyrites into the United States in the five months ending May 31 are shown below, in long tons:

	1903.	1904.	Changes.
Pyrites	174,680	134,205	D. 40,475
Sulphur content	82,099	63,076	D. 19,023

The decrease this year is equivalent to about 23%, which is felt by the Spanish mines, since they supply the bulk of our imports.

Nitrate of Soda.—Statistically the market is in a strong position, pivoting prices at $2.15@$2.20 per 100 lb. for spot and nearby arrivals and $2.125@$2.175 for futures.

Consumption of nitrate of soda in the United States in the five months ending May 31 was approximately as follows, in long tons:

	1903.	1904.	Changes.
Stock Jan. 1	7,800	8,100	I. 300
Imports	103,290	130,825	I. 27,535
Total supply	111,090	138,925	I. 27,835
Deliveries	110,490	129,045	I. 18,545
Stocks, June 1	600	9,880	I. 9,280

Consumption this year shows an increase of nearly 17%, and is the largest on record.

Sulphate of Ammonia.—Evidently speculators abroad are taking advantage of the favorable statistical position to maintain firm prices, and as a result the market here is stronger, though quiet. Good gas liquor is worth $3.65@$3.75 per 100 lb. Great Britain's exports to the United States in May amounted to 857 tons, about 6% of the 14,218 tons shipped to all countries. Since January Great Britain exported 80,192 tons, which is 5,488 tons more than last year.

Phosphates.—Export trade this year shows a marked improvement, the quantity reported for the five months ending May 31 being 350,452 tons, or 43,270 tons (14%) more than 1903. To an extent the heavy purchases of high-grade rock by Germany and of land-pebble by France and Italy are responsible for the increase this year. Somewhat better prices have been received on these exports, and at the average for the five months the total quantity for the whole year should exceed 840,000 tons.

New orders are few, but miners are busy filling running contracts and emphasize their opinion that higher prices will prevail in the near future.

Phosphates are quoted as follows, per ton:

Phosphates.	F. o. b.	C. i. f. Gt. Britain or Europe.
*Fla. hard rock, 77@80%	$7.25@$7.50	$9.89@11.10
land pebble, 68@73%	3.75& 4.00	6.39@ 8.05
†Tenn. 78@80%	4.00@ 4.25	9.88@10.66
78%	3.75@ 4.00	.....
75%	3.25@ 3.50	.....
73@74%	2.95@ 3.20	.....
‡So. Car. land rock	3.00@ 3.25	.....
river rock, 55@60%.	2.75@ 3.00	5.75@ 6.56
Algerian 63@70%	....	6.82@ 7.32
58@63%	....	6.05@ 6.50
53@58%	....	4.95@ 5.00
Tunis (Gafsa)	....	5.75@ 6.50
Christmas Isle, 80@85%	....	11.75@12.54
Ocean Isle, 82@88%	....	12.54@12.98
Somme, Fr., 70@75%	....	10.63@11.02
Bordeaux, Fr., 60@65%	....	7.60@ 7.72
55@60%	....	6.44@ 6.55
Liege, Bel., 60@65%	....	7.00@ 7.10

* F. o. b. Florida or Georgia ports. † F. o. b. Mt. Pleasant. ‡On vessel, Ashley River, S. C.

Liverpool. June 22.

(Special Report of Joseph P. Brunner & Co.)

Outside of contract deliveries the demand for heavy chemicals is not very brisk, but quotations are steadily maintained.

Soda ash is firm. For tierces, nearest range is about as follows: Leblanc ash, 48%, £5@£5 10s.; 58%, £5 10s.@£6 per ton, net cash; ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s.; bags 5s. per ton under price for tierces. Soda crystals are in steady request at generally £5 7s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda is quiet, but firm, as follows: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s.; 76%, £10 10s. per ton, net cash. Special quotations for export to the Continent and a few other export quarters.

Bleaching powder continues sluggish and prices are nominal at from £4@£4 10s. per ton, net cash, for hardwood packages, as to market.

Chlorate of potash is in limited demand at 2⅞d.@3d. per lb., net cash.

Bicarbonate of soda is receiving a fair amount of attention from buyers, and is firm at £6 15s. per ton, less 2½% for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of ammonia is again firmer, at £12 3s. 9d.@£12 5s. per ton, less 2½% for good gray 24@25% in double bags f. o. b. here. Nitrate of soda is in fair demand on spot, at £10 5s.@£10 10s. per ton, less 2½% for double bags f. o. b. here, as to quality.

METAL MARKET.

New York, July 6.

Gold and Silver Exports and Imports,

At all United States Ports in May and Year.

Metal	May		Year.	
	1903.	1904.	1903.	1904.
Gold: Exports.	$14,488,268	$43,071,053	$18,828,853	$66,928,849
Imports.	1,462,845	10,472,512	11,208,501	42,878,021
Excess	E. $13,025,423	E. $32,598,541	E. $7,620,152	E. $24,050,828
Silver: Exports.	2,148,412	5,098,013	15,848,929	21,957,065
Imports.	1,612,581	1,943,988	7,930,489	10,983,827
Excess	E. $535,831	E. $3,154,025	E. $8,018,440	E. $10,973,238

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending July 2 and total from January 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week	$26,300	$38,804	$603,225	$4,982
1904	63,679,462	3,518,570	20,560,179	450,886
1903	21,459,080	3,533,035	9,417,936	1,107,755
1902	16,503,857	1,226,216	13,804,555	670,571

General business continues quiet, in most lines rather dull. It was further affected this week by the holiday, and the beginning of the vacation season.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending July 2 gives the following totals, comparison being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts	$917,442,200	$1,075,031,500
Deposits	903,892,900	1,152,988,800
Circulation	43,909,100	39,209,600
Specie	159,302,300	239,371,800
Legal tenders	75,048,600	84,980,700
Total reserve	$234,350,900	$324,352,500
Legal requirements	225,973,225	288,247,200
Balance surplus	$8,377,675	$36,105,300

Changes for the week this year were increases of $8,218,300 in loans and discounts, $9,674,700 in deposits, $239,500 in circulation, and $1,067,800 in legal tenders; decreases of $996,500 in specie, and $2,347,375 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	1903.		1904.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd	$159,302,300	.....	$239,371,800	.....
England	186,555,940	.....	176,696,410	.....
France	500,784,645	$224,885,400	555,296,885	$226,580,255
Germany	163,593,000	57,475,000	184,360,000	64,775,000
Spain	72,800,000	103,640,000	73,580,000	102,665,000
Netherlands	19,703,000	33,261,000	27,385,000	33,308,000
Belgium	14,803,335	7,401,690	15,163,335	7,581,665
Italy	92,560,000	11,325,000	110,520,000	19,960,000
Russia	392,780,000	44,925,000	456,650,000	41,155,000
Austria	229,150,000	65,900,000	235,590,000	65,075,000

The returns of the Associated Banks of New York are of date of July 2, and the others June 30, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chifley gold. The Bank of England reports gold only.

Silver has shown a decidedly strong tendency. The Indian bazaars have been free buyers and the market closes strong for both spot and forward metal.

Shipments of silver from London to the East for the year up to June 23 are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.		Changes.
India	£3,233,025	£5,279,423	I.	£2,046,398
China	205,843	257,227	I.	51,384
Straits	326,079	58,103	D.	267,976
Total	£3,764,947	£5,594,753	I.	£1,829,806

Receipts for the week this year were £137,000 in bar silver from New York, with £4,000 from Australia; total, £141,000. Shipments were £27,500 in bar silver to Calcutta, and £85,000 to Malta; total, £32,500.

Indian exchange has been slightly easier, and the Council bills offered in London brought an average of 16d. per rupee. Money is abundant in India, and there has been some increase in the buying of silver for that country.

The coinage executed at the mints of the United States in June and the fiscal year ending June 30 is reported by the Bureau of the Mint, Treasury Department, as below:

Denomination.	June. Pieces.	Value.	Year. Value.
Double eagles	601,485	$12,029,700.00	$197,169,780.00
Eagles	157,460	1,574,600.00	7,335,520.00
Half eagles	256,012	1,280,060.00	3,634,990.00
Quarter eagles	16	40.00	378,352.50
Total gold	1,014,973	$14,884,400.00	$208,618,642.50
Dollars	522,065	522,065.00	10,101,650.00
Half dollars	350,090	175,045.00	2,231,337.50
Quar. dollars	580,090	145,022.50	3,179,496.00
Dimes	90	9.00	2,308,397.50
Total silver	1,452,335	$142,141.50	$17,820,881.00
5c.-nickels	2,921,129	146,056.45	1,117,456.45
1c.-bronze	3,104,160	31,041.60	645,171.60
Total minor	6,025,289	$177,098.05	$1,762,628.05
Total coinage	8,492,597	$15,903,639.55	$228,202,151.55

The coining of 10,101,650 silver dollars, the last to be made from the bullion purchased under the Sherman law, brings the total stock in the country up to 567,908,319. The balance of the silver bullion on hand will be converted into subsidiary coins.

In addition to the above, there were coined for the Philippine Government in June 1,480,332 pesos, 10,332 50 centavos, 10,332 20c., 10,332 10c., 10,325 5c., 9,750,375 1c., 14,325 0.5c.; total, 11,286,353 pieces, making 67,910,489 pieces for the fiscal year. There were also minted during the year 2,100,000 pieces for the Venezuelan government, and 630,000 pieces for Costa Rica.

The Treasury Department's estimate of the amount and kinds of money in the United States on July 1 is as follows:

	Total.	In Treasury.	In circulation.
Gold Coin inc. bul. in Tr'y.	$1,326,722,701	$215,329,753	$646,586,319
Gold Ct'fs.	.....	.....	464,806,629
Silver Dollars	560,083,544	25,943,145	71,561,684
Silver Ct'fs.	.....	.....	462,578,715
Subsid. Silver	106,164,848	11,561,820	94,603,028
Tr'y Nts. '90	12,978,000	50,713	12,927,287
U. S. Notes	346,681,016	12,189,039	334,491,977
Currency Ct'fs.	.....	.....	.....
Nat. Bk. Notes	449,235,095	15,639,207	433,595,888
Total	$2,801,865,204	$280,713,677	$2,521,151,527

Population of the United States July 1, 1904, estimated at 81,867,000; circulation per capita, $30.80. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the Government. This statement of money held in the Treasury as assets of the Government does not include deposits of public money in national bank depositaries, to the credit of the Treasurer of the United States, and amounting to $106,078,822. The total amount in circulation on July 1 shows an increase of $11,871,610 over June 1; and an increase of $144,828,317 over June 1, 1903.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.46	$0.47½
Peruvian soles and Chinese pesos	.41	.44
Victoria sovereigns	4.86	4.87
Twenty francs	3.86	3.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

June-July.	Copper. Lake, Cts. per lb.	Electrolytic, Cts. per lb.	Cathodes, Cts. per lb	London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter. N. Y., Cts. per lb.	St. Louis, per lb. Cts.
30	12¼ @12½	12⅛ @12⅜	11⅞ @12⅛	56¾	25¼	4.15 @4.20	4.85 @4.87½	4.70@ 4.72½
1	12⅛ @12⅜	12⅛ @12⅜	11⅞ @12⅛	56¾	26	4.15 @4.20	4.85 @4.87½	4.70@ 4.72½
2	12¼ @12⅜	12¼ @12⅜	11⅞ @12⅛	....	26	4.15 @4.20	4.85 @4.87½	4.70@ 4.72½
4	....	....	....	56⅞	....	....	....	....
5	12¼ @12½	12¼ @12⅜	11⅞ @12⅛	57⅛	25⅞	4.15 @4.20	4.85 @4.87½	4.70@ 4.72½
6	12¼ @12⅜	12¼ @12⅜	11⅞ @12⅛	57¼	@25⅞ 25¾	4.15 @4.20	4.85 @4.87½	4.70 4.72½

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars.

SILVER AND STERLING EXCHANGE.

June-July.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	July.	Sterling Exchange	Silver. New York, Cents.	Silver. London Pence.
30	4.8710	56¾	26⅛	4	.....	.....	26⅞
1	4.87	57¼	26⅜	5	4.87⅛	58¼	26⅞
2	4.87	57¾	26⅝	6	4.87⅛	58⅜	26⅞

New York quotations are for fine silver per ounce Troy London prices are for sterling silver .925 fine.

Copper.—The market has presented more or less of a holiday appearance, and nothing of interest has transpired on this side. A fair business, however, has been done for export. Shipments to Europe during the month of June amounted to about 16,000 tons. The closing quotations are given as 12¼@12½c. for Lake copper; 12⅛@12⅜c. for electrolytic in ingots, cakes and wirebars; 11⅞@12⅛c. in cathodes; 12c. for casting copper.

The market for standard copper in London, which closed last week at £56 17s. 6d., opened on Monday at the same price, and the closing quotations on Wednesday are cabled at £57 5s.@£57 6s. 3d. for spot, £57 2s. 6d.@£57 3s. 9d. for three months.

Statistics for the second half of June show an increase in the visible supplies of 17 tons.

Refined and manufactured sorts we quote: English tough, £60@£60 5s.; bst selected, £60 10s.@£60 15s.; strong sheets, £69 10s.@£70; India sheets, £64 10s.@£65; yellow metal 6¼d.

Exports of copper from New York and Baltimore for the week ending July 5 were 4,806 tons, principally to Great Britain, Germany, Holland, France and Austria.

Exports of copper in all forms from the United States, for the five months ending May 31, are reported by the Bureau of Statistics of the Department of Commerce and Labor as follows; the figures given are in long tons of 2,240 pounds:

	1903.	1904.	Changes.	
Copper, bars, ingots, etc.	56,900	97,266	I.	40,366
Copper ores and matte	5,401	7,513	I.	2,112

The exports of copper ingots, etc., this year show an increase of 70.9%. The report does not separate ores and matte. Estimating their copper contents, chiefly on the basis of values, we find that the total metal exported from the United States, in all forms, for the five months, was approximately equal to 99,681 long tons of fine copper.

Imports of copper and copper material into the United States, for the five months ending May 31, with re-exports of foreign material, are reported by the Bureau of Statistics as follows, the figures being in long tons:

Fine copper:	1903.	1904.	Changes.	
Imports	24,305	26,223	I.	1,918
Re-exports	1,016	105	D.	911
Net imports	23,289	26,118	I.	2,829
Ores and matte:				
Imports	102,482	116,048	I.	13,566
Re-exports	3,304	.....	D.	3,304
Net imports	99,178	116,048	I.	16,870

The copper contents of the ores and matte imported this year are given by the report at 5,888 long tons. This makes the total net imports, in all forms, this year, equal to 31,473 tons of fine copper. Deducting this from the total exports given above, we find that we sent abroad in the five months, 68,208 tons of copper more than we received.

Of the imports this year, Mexico is credited with 19,464 tons of fine copper and 26,442 tons ore and matte, containing 2,812 tons of copper—22,276 tons of metal in all. Canada and Newfoundland furnished 3,185 tons of copper and 81,774 tons of ore and matte containing 2,934 tons of copper—6,119 tons of metal in all. These two countries furnished 90.2% of the net imports this year.

Tin has ruled steady through the week without any special feature. The closing quotations are given as 25¾@25⅞c.

The foreign market, which closed last week at £118, opened on Monday at £117 17s. 6d., declined on Tuesday to £117 5s. and the closing quotations on Wednesday are cabled as £117@£117 2s. 6d. for spot, £117@£117 2s. 6d. for three months.

Statistics for the month of June show a decrease in the visible supplies of 600 tons.

Imports of tin into the United States for the five months ending May 31, are reported as follows, in long tons, of 2,240 pounds:

	1903.	1904.	Changes.
Straits	10,191	7,452	D. 2,739
Australia	122	100	D. 22
Great Britain	6,742	8,387	I. 1,645
Holland	440	331	D. 109
Other Europe	198	180	D. 18
Other countries	28	16	D. 12
Totals	17,721	16,466	D. 1,255

The decrease in imports this year was 7.1%. Most of the tin received through Great Britain is Straits tin, so that the larger part of our supply is in that brand. The larger part of the imports this year came through British and Dutch ports.

Lead.—There has been a good inquiry and the market has a rather strong undertone. The closing quotations are given as 4.15@4.20 New York, 4.07½@4.12½ St. Louis.

The foreign market is firm, Spanish lead being quoted at £11 10s.@£11 11s. 3d.; English lead, £11 12s. 6d.@£11 13s. 9d.

Imports of lead into the United States, with re-exports of foreign lead, for the five months ending May 31, are reported by the Bureau of Statistics as follows; the figures being given in short tons, of 2,000 pounds:

	1903.	1904.	Changes.
Lead metallic	191	5,092	I. 4,901
Lead in ores and base bullion	40,163	39,259	D. 904
Total imports	40,354	44,351	I. 3,997
Re-exports	28,454	34,340	I. 5,886
Net imports	11,900	10,011	D. 1,889

Of the imports this year 41,468 tons were from Mexico, and 2,099 tons from Canada. In addition to the re-exports given above, there were 164 tons of domestic lead exported in the five months, against 55 tons last year.

St. Louis Lead Market.—The John Wahl Commission Co. telegraphs us as follows: Lead is firm and fairly active. Missouri brands are selling at 4.10c., while 4.12½c. is the quotation for desilverized lead.

Spelter remains firm, with good consumptive demand. It is reported that the Missouri zinc mines will be shut down for two weeks. The closing quotations are 4.70@4.72½ St. Louis, 4.85@4.87½ New York.

The foreign market remains firm, good ordinaries being quoted at £22, specials £22 5s.

Exports of spelter, or metallic zinc, from the United States for the five months ending May 31, were 995 short tons, against 1,076 tons in the corresponding period 1903; a decrease of 81 tons last year. Exports of zinc ore for the five months were 12,927 long tons, against 18,207 tons in 1903; showing a decrease of 5,280 tons this year.

St. Louis Spelter Market.—The John Wahl Commission Co. telegraphs us as follows: Spelter is steady. The latest sales are on a basis of 4.77½c. East St. Louis for prompt and nearby delivery.

Antimony is unchanged. We quote: Cookson's, 7@7⅜; Hallett's, 6⅜@6½; U. S., Italian, Japanese, French, Hungarian and Chinese, 5⅞@6c.

Imports of antimony in all forms into the United States for the five months ending May 31, are reported as follows, in pounds:

	1903.	1904.	Changes.
Metal and regulus	2,764,805	1,569,579	D. 1,195,226
Antimony ore	1,725,442	1,402,680	D. 322,762

This shows a decrease of 43.2% in metal and regulus; also a decrease of 18.7% in the ore imported this year.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per pound.

Exports of nickel, nickel oxide and nickel matte from the United States for the five months ending May 31 were 1,685,078 lb., against 907,048 lb. in the corresponding period in 1903; an increase of 778,050 lb. this year. Imports of nickel ore and matte in the month of May were 741 tons. In May, 1903, these imports were not reported separately.

Platinum.—Quotations are nominally $18.50 per ounce, but the tendency is upward, and higher prices are expected.

Platinum in manufactured forms is very firm. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 77c.; crucibles and dishes, 80c.; perforated ware, like cones, etc., 85c. per gram.

Imports of platinum into the United States for the five months ending May 31, were 2,868 lb., against 3,901 lb. in the corresponding period in 1903; showing a decrease of 1,033 lb. this year.

Quicksilver.—The New York price is $44.50 @$45 per flask, for large lots, with a slightly higher figure quoted for smaller orders. The San Francisco current price is $43@$44 for domestic, and $42@$43 for export. The London price is £8 per flask for Spanish, and £7 19s. for Italian.

Exports of quicksilver from the United States for the five months ending May 31 were 883,927 lb., against 532,135 lb. in the corresponding period in 1903; an increase of 351,792 lb. this year.

Minor Metals and Alloys.—Thallium is quoted at 60@65 marks per kg., at Breslau, Germany. Manganese metal is quoted 360 marks per 100 kg., f. o. b. Bremen, Germany, Manganese tin alloy, 55% is quoted 365 marks per 100 kg. for first quality, and 225 marks for second quality, both f. o. b. Bremen.

For other minor metals, and their alloys, wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb		Per lb
No. 1, 99% ingots	33@37c.	Ferro-chromium (74%)	12½c.
No. 2, 90% ingots	31@34c.	Ferro-Tungsten (37%)	38c.
Rolled Sheets	4c. up	Magnesium, pure (N. Y.)	60c.
Alum-bronze	30@33c.	Manganese	$2.75
Nickel-alum	33@39c.	Mangan'e Cop. (20% Mn)	32c.
Bismuth	$2.10	Mangan'e Cop. (30% Mn)	38c.
Chromium, pure (N. Y.)	80c.	Molybdenum (Best)	$2.00
Copper, red oxide	50c.	Phosphorus, foreign	45c.
Ferro-Molybde'm (50%)	$1.25	Phosphorus, American	70c.
Ferro-Titanium (10%)	90c.	Sodium metal	50c
Ferro-Titanium (20@25% N. Y.	55c.	Tungsten (Best)	88c

Missouri Ore Market. July 2.

(From Our Special Correspondent.)

The highest price paid for zinc ore was $35 per ton and the assay basis was $30 to $33 per ton of 60% zinc. Lead sold all week at $53 per ton.

Following are the shipments of zinc and lead from each of 20 camps of the Joplin district for the week:

	Zinc, lb.	Lead, lb.	Value.
Joplin	2,069,940	279,970	$50,485
Webb City-Carterville	2,196,600	420,430	48,985
Galena-Empire	1,222,490	115,790	22,630
Alba-Neck	741,260	.....	12,600
Granby	655,150	65,000	10,600
Prosperity	587,520	39,280	10,140
Duenweg	384,250	140,630	10,255
Aurora	504,000	6,500	7,575
Carthage	274,860	28,670	5,440
Oronogo	259,170	31,840	4,645
Badger	259,760	.....	4,675
Zincite	177,880	25,260	3,700
Carl Junction	135,390	3,740	2,400
Reeds	128,050	12,840	2,390
Wentworth	126,730	.....	1,990
Diamond	114,600	.....	1,845
Mitchell	66,040	22,230	1,770
Cave Springs	59,190	2,360	1,070
Spurgeon	60,920	.....	485
Beef Branch	9,990	36,500	810
Totals	10,573,790	1,231,040	$204,490
27 weeks	275,354,550	34,525,940	$5,491,530
Zinc value, the week, $172,250; 27 weeks, $4,531,980.			
Lead value, the week, 32,240; 27 weeks, 956,580.			

A World's Fair holiday was inaugurated among the mine operators by a large majority of them closing down their mines and mills tonight for a period of two weeks. Workmen who do not care to take advantage of the holiday will be given employment at repair and prospect work during the interval, but outputting will be reduced to a minimum. The holiday was quietly talked up and brought to a culmination without a public meeting being held, the larger producers conferring together and the others joining upon invitation. Besides intended to give employees an opportunity of visiting the World's Fair, or enjoying a midsummer outing, the holiday is aimed at a restriction of the output that will practically clean up the reserve stock on the beginning of the last half of the year, to prevent so radical an expedient as was found necessary at the close of the past two years—extended shutting down of the mines and the reserve ore could be taken up. It is hoped that, with the demand increased by the new smelters now in the market, no further effort at restriction will be necessary.

Average Prices of Metals per lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903	1904.	1903.	1904.	1903.	1904.
Jan...	28.33	28.845	4.075	4.347	4.865	4.863
Feb..	29.43	28.087	4.075	4.375	5.043	4.916
Mar..	30.15	28.317	4.442	4.475	5.349	5.067
April.	29.81	28 132	4.567	4.475	5.550	5.219
May .	29.51	27.718	4.325	4.423	5.639	5.031
June .	28.34	26.325	4.210	4.196	5.697	4.760
July..	27.68	.....	4.075	.....	5.662	....
Aug..	28.29	.....	4.075	.....	5.725	....
Sept..	26.77	.....	4.243	.....	5.686	....
Oct...	25.92	.....	4.375	.....	5.510	....
Nov..	25.42	.....	4.218	.....	5.338	....
Dec...	27.41	.....	4.162	.....	4.731	....
Year	28.09	.....	4.237	.....	5.400	....

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.; February, 4.717c.; March, 4.841c.; April, 5,038c.; May, 4,853c.; June, 4.596c.

Average Prices of Copper.

Mo.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan...	12.159	12.410	12.361	12.553	53.52	57.55
Feb...	12.778	12.063	12.901	12.245	57.34	56.57
Mar..	14.416	12.299	14.572	12 551	63.85	57.321
April.	14.454	12.923	14.642	13.120	61.72	58.247
May..	14.435	12.758	14.618	13.000	61.73	57.321
June .	13.942	12.269	14.212	12.399	57.90	56.398
July..	13.694	.....	13.341	.....	56.64	.....
Aug..	12.962	.....	13.159	.....	58.44	....
Sept..	13.205	.....	13.345	.....	56.82	.....
Oct...	12.801	.....	12.954	.....	55 60	.....
Nov..	12.617	.....	12.813	.....	56.30	.....
Dec..	11.952	.....	12,084	.....	56.36	.....
Year	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London. Pence.	N. Y., Cents.	London Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
Jan..	25.62	55.56	21.98	47.57	26 423	57.055
Feb..	25.41	55.09	22.11	47.89	26.665	57.592
Mar..	25.00	54.23	22.49	48.72	26.164	56,741
April.	24.34	52.72	23.38	50.56	24 974	54.202
May..	23.71	51.31	24.89	54.11	25.578	55.430
June .	24.17	52.36	24.29	52.86	25.644	55.673
July..	24.38	52.88	24.86	53.92	.....	.....
Aug..	24.23	52.52	25.63	55.36	.....	.....
Sept..	23.88	51.52	26.75	58.00	.....	.....
Oct...	23.40	50.57	27.89	60.36	.....	.....
Nov..	22.70	49.07	27.01	58.11	.....	.....
Dec...	22.21	48.03	25.73	55.375	.....	.....
Year	24.09	52.16	24.75	53.57	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Company	Latest Dividend—Payable.	Rate.	Total.	Total to date.
Am. Cement	July 21	$.40	$80,000	$700,000
†Am. Sm. & R., com.	July 26	1.25	625,000	1,875,000
†Cen. Coal & Co., com.	July 15	1.50	76,875	781,875
†Cen. Coal & C., pf.	July 15	1.25	23,437	867,183
Greene Con. Mex.	Aug. 1	.30	259,200	1,170,220
*Imperial Oil, Cal.	July 6	.20	20,000	640,000
*New Century Zinc.	July 1	.01	1,500	.....
New Century Zinc, ex.	Aug. 1	.00½	750	5,800
Osceola, Mich.	July 28	1.00	96,150	4,439,600
†Phil. Nat. Gas, com.	Aug. 1	.75	398,888	4,613,495
Sacramento, Utah	July 1	.02½	5,000	208,000
*Thirty-three Oil, Cal.	July 6	.10	10,000	310,000
United Zinc, pf.	July 15	.50	9,499	144,354
U. S., Utah	Aug. 15	.50	210,000	210,000
Utah Con., Utah	July 15	1.50	450,000	2,586,000

*Monthly. †Quarterly.

ASSESSMENTS.

Company.	Delinquent.	Sale.	Amount.
Allouez, Mich	Sept. 26	.....	$1.50
Am. Quartz, Cal.	July 25	.....	.10
Andes, Nev.	July 11	Aug. 1	.10
Centennial Copper, Mich.	July 12	.....	2.00
Challenge Con., Nev.	July 13	Aug. 3	.10
Champion, Cal.	July 18	.....	.50
Chollar, Nev.	July 13	Aug. 3	.10
Comstock, Utah	July 27	Aug. 15	.10
Little Chief, Utah.	July 28	Aug. 16	.01
Nyak Bay, Alaska.	July 25	.....	.02
Potosci, Nev.	July 20	Aug. 10	.10
Savage, Nev.	July 15	Aug. 5	.10
White Swan, Ore.	July 28	.....	.05

STOCK QUOTATIONS

NEW YORK.

Company.	Par val.	June 29 H.	June 29 L.	June 30 H.	June 30 L.	July 1 H.	July 1 L.	July 2 H.	July 2 L.	July 4* H.	July 4* L.	July 5 H.	July 5 L.	Sales.
Amalgamated, c..	$100	49⅞	....	50	49¾	50⅜	49⅞	....	....	....	....	50½	50	18,585
Anaconda, c.....	25	....	....	72	70¼	....	....	....	....	....	....	....	....	400
Best & Belcher, s..	3	....	....	....	....	....	....	....	....	....	....	....	....	....
Brunswick.....	1	6	....	....	....	....	....	....	....	....	....	....	....	400
Caledonia.....	1	....	....	60	....	....	....	....	....	....	....	58	....	200
Choller, s.....	2½	8	....	....	....	....	....	....	....	....	....	10	9	400
Confidence, s.....	3	....	....	80	....	....	....	....	....	....	....	....	....	200
Con.Cal.&Va., g.s.	2½	....	....	....	....	....	....	....	....	....	....	1.10	....	200
Cripple Creek, g.	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Crown Pt., g. s...	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Elkton, g.....	1	72	....	....	....	....	....	....	....	....	....	67	....	300
El Paso, g.....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Gold Dollar.....	1	....	....	....	....	4½	....	....	....	....	....	....	....	500
Gould & Curry, s.	1	....	....	....	....	20	....	....	....	....	....	....	....	300
Greene Con., c....	10	14¾	14⅜	15	14⅜	14⅜	14¾	....	....	....	....	15	14⅜	....
Hale & Norc's,g.s.	3	....	....	....	....	....	....	....	....	....	....	....	....	....
Homestake, g.....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Horn Silver s l....	20	....	....	....	....	....	....	....	....	....	....	....	....	....
Iron Silver.....	1	....	....	....	....	1.85	....	....	....	....	....	....	....	200
Isabella, g.....	1	....	....	27	26	26	....	....	....	....	....	24	....	1,600
Jack Pot, g.....	1	....	....	....	....	8	....	....	....	....	....	....	....	500
Justice, s.....	21	14	....	....	....	15	....	....	....	....	....	....	....	300
Mexican, s.....	3	95	....	....	....	1.10	....	....	....	....	....	1.10	....	600
Moon Anchor, g..	3	....	....	....	....	....	....	....	....	....	....	8	....	500
Old Gold.....	1	....	....	10	....	....	....	....	....	....	....	....	....	500
Occidental, s....	3	....	....	....	....	78	....	....	....	....	....	....	....	100
Ophir, s.....	5	....	....	....	....	3.15	....	....	....	....	....	....	....	100
Overman, s.....	2	....	....	....	....	....	....	....	....	....	....	....	....	200
Pharmacist.....	1	....	....	3½	....	....	....	....	....	....	....	....	....	1,000
Phœnix, g.....	1	29	25	28	24	26	22	....	....	....	....	24	20	63,400
Portland, g.....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Potosi, s.....	1	8	....	....	....	....	....	....	....	....	....	9	....	300
Quicksilver.....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Quicksilver, Pf...	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Savage, s.....	3	....	....	....	....	....	....	....	....	....	....	....	....	....
Sierra Nevada s..	3	....	....	....	....	....	....	....	....	....	....	....	....	....
Silver Hill, Pf...	100	65	....	....	....	64	63	....	....	....	....	....	....	500
StandardCon.,g.s.	10	....	....	2.05	....	....	....	....	....	....	....	2.20	....	300
Tennessee, c.....	25	31	28	31	28	31	28	....	....	....	....	31	28	....
Union Con., g. s....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Union Copper....	10	....	....	....	....	....	....	....	....	....	....	....	....	....
United Copper....	100	5⅛	....	5¾	....	5½	....	....	....	....	....	5½	....	....
Utah, s.....	1	....	....	14	....	....	....	....	....	....	....	14	....	400
White Knob, c....	10	7	6½	6	....	6½	6	....	....	....	....	6	4½	....
Work, g.....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Yellow Jacket, s..	3	....	....	....	....	....	....	....	....	....	....	....	....	....

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 91,785 shares
*Holiday.

BOSTON, MASS.

Company.	Par val	June 29 H.	June 29 L.	June 30 H.	June 30 L.	July 1 H.	July 1 L.	July 2* H.	July 2* L.	July 4* H.	July 4* L.	July 5 H.	July 5 L.	Sales.
AdventureCon.,c	$25	1¼	....	....	....	1¼	....	....	....	....	....	1½	....	80
Allouez, c.....	25	7½	7¼	8	7¾	8⅜	8	....	....	....	....	8⅝	8½	3,125
†Amalgamated,c.	100	50	49⅜	50	49⅞	50¼	50	....	....	....	....	50¾	50	1,502
Anaconda, c. s..	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Arcadian, c.....	25	75	60	70	....	....	....	....	....	....	....	75	....	1,425
Arnold, c.....	25	25	....	....	....	....	....	....	....	....	....	....	....	200
Atlantic, c.....	25	....	....	....	....	7⅛	....	....	....	....	....	....	....	80
Bingham Con.....	50	24¼	24	24⅜	24⅛	24⅜	24⅛	....	....	....	....	....	....	2,250
Calumet & Hecla	25	....	....	....	....	4.55	....	....	....	....	....	4.60	4.55	23
Centennial, c....	25	....	....	20¾	20	20¾	20	....	....	....	....	20¾	20¼	777
†Central Oil.....	25	9¼	....	9	8⅞	9	....	....	....	....	....	....	....	850
Con. Mercur, g...	5	$23	....	$23	....	$27	....	....	....	....	....	....	....	650
Copper Range ..	100	43	....	43	42½	43⅜	43	....	....	....	....	43½	43	938
†Daly West, g.s.l	20	....	....	24	23½	23⅝	23⅝	....	....	....	....	23¾	....	625
Dominion Coal...	100	41	40	41¾	41	42¼	42	....	....	....	....	43	41½	1,200
Preferred.....	....	....	....	....	....	....	....	....	....	....	....	106	104	120
Dominion I. & S.	100	....	....	7½	....	....	....	....	....	....	....	....	....	50
Elm River, c....	12	....	....	....	....	....	....	....	....	....	....	....	....	....
Franklin, c.....	25	....	....	7¾	....	....	....	....	....	....	....	....	....	20
Granby Con.....	10	....	....	....	....	....	....	....	....	....	....	3	....	200
Guanajuato Con.	5	....	....	1⅜	....	1⅜	....	....	....	....	....	....	....	105
Isle Royal Con..	25	8	....	8	....	8	....	....	....	....	....	8¼	....	311
Mass Con., c....	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Mayflower, c.....	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Michigan, c.....	25	3⅞	....	....	....	4	....	....	....	....	....	4	....	195
Mohawk, c.....	25	41	40¾	41½	40¾	40¼	41½	....	....	....	....	41	40¾	347
Mont. Coal & C..	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Mont'l & Boston.	5	....	....	45	....	....	....	....	....	....	....	40	....	200
New Idria, q....	5	....	....	....	....	....	....	....	....	....	....	....	....	....
Old Colony, c....	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Old Dominion, c.	25	13	12¾	$13	$12¼	....	....	....	....	....	....	12¼	....	125
Osceola, c.....	25	61	60	61	60¾	61	60½	....	....	....	....	61	....	603
Parrot, s. c.....	10	....	....	25¼	....	....	....	....	....	....	....	....	....	50
Phœnix Con, c...	25	1¾	....	....	....	....	....	....	....	....	....	1¼	....	165
Quincy, c.....	25	....	....	83	....	84	83	....	....	....	....	85	....	60
Rhode Island, c..	25	....	....	....	....	75	....	....	....	....	....	....	....	50
Santa Fe, g. c ..	10	1⅜	1¼	1¼	....	1¾	1⅜	....	....	....	....	1⅜	1⅝	1,490
Shannon, c.	10	5½	5¼	5½	....	5⅝	....	....	....	....	....	5⅝	....	715
Tamarack, c.....	25	....	....	90	87	90	87	....	....	....	....	91	90	190
Tecumseh, s.....	25	1.00	25	35	....	....	....	....	....	....	....	....	....	205
Trinity, c.....	25	5	4⅜	4¾	....	4¾	....	....	....	....	....	4¾	....	445
Un. C. T'd & Mg:	....	2½	....	....	....	....	....	....	....	....	....	....	....	100
United States, g..	10	21⅝	21	21⅝	21⅜	21⅝	21⅛	....	....	....	....	21¾	21⅜	4,915
U. S. Coal & Oil..	25	10	9⅞	10	....	9⅞	9¾	....	....	....	....	10⅛	....	483
Utah Con., g. c..	5	36⅜	36⅜	36⅝	36⅛	36½	36¼	....	....	....	....	†37⅜	36⅛	5 895
Victoria, c.....	25	2⅞	....	3⅛	3	3	....	....	....	....	....	2⅞	....	277
Winona, c.....	25	6⅛	....	....	....	6¾	....	....	....	....	....	7⅛	6¾	601
Wolverine, c....	25	....	....	....	....	73¾	73¼	....	....	....	....	74	....	132
Wyandot, c.....	25	....	....	....	....	75	....	....	....	....	....	....	....	200

c—Copper g—Gold. l—Lead. q—Quicksilver. s—Silver. Total sales, 31,869 shares.
†Ex-dividend. *Holiday. §First installment paid.

COAL, IRON AND INDUSTRIAL STOCKS.

Company.	Par val.	June 29 H.	June 29 L.	June 30 H.	June 30 L.	July 1 H.	July 1 L.	July 2‡ H.	July 2‡ L.	July 4‡ H.	July 4‡ L.	July 5 H.	July 5 L.	Sales
Allis-Chalmers....	$100	....	....	....	....	....	....	....	....	....	....	....	....	....
Preferred.....	100	....	....	....	....	42⅝	....	....	....	....	....	43½	42¾	800
Am. Agr. Chem....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Preferred.....	100	73¼	....	....	....	....	....	....	....	....	....	....	....	50
†Am. Sm. & Ref..	100	54⅜	54¼	55	54½	55⅝	54⅞	....	....	....	....	55¾	....	9,100
Preferred.....	100	97	96¾	97¼	96⅞	97⅛	96⅞	....	....	....	....	97	....	4,610
Col. Fuel & I....	100	....	....	....	....	30¼	....	....	....	....	....	30½	....	380
Col. F. & Iron, Pf.	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Col. & H. C. & I..	100	....	....	9¼	....	....	....	....	....	....	....	....	....	200
Crucible Steel....	100	4½	4¼	4⅜	4	4½	....	....	....	....	....	....	....	800
Preferred.....	100	36¾	....	35⅞	35¾	36	35⅝	....	....	....	....	....	....	263
General Chem....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Preferred.....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Mong. R. Coal....	50	....	....	....	....	8	....	....	....	....	....	....	....	150
Preferred.....	50	21⅜	....	....	....	....	....	....	....	....	....	....	....	20
National Lead....	100	19¼	19¼	19⅜	....	20	....	....	....	....	....	....	....	600
Preferred.....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Phila. Nat. Gas....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Preferred.....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Pittsburg Coal....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Preferred.....	100	57¾	57½	....	....	57¼	....	....	....	....	....	....	....	152
Republic I. & S...	100	6¼	....	....	....	....	....	....	....	....	....	6½	....	500
Preferred.....	100	41	....	41	....	41	....	....	....	....	....	42	....	400
Sloss-Shef S. & I..	100	35½	34¾	....	....	35	....	....	....	....	....	35	....	800
Preferred.....	100	....	....	....	....	....	....	....	....	....	....	....	....	....
†Standard Oil.....	100	6.30	6.27½	6.31	6.30	631⅛	630¼	....	....	....	....	6.28	6.27	158
Tenn. C.I. & R.R..	100	35⅜	....	35¼	35	35	....	....	....	....	....	35¾	35	1,050
U.S.Steel Corp....	100	9⅞	9¾	9⅞	9⅝	9⅞	9¾	....	....	....	....	10⅛	9⅞	10,925
Preferred.....	100	55½	55¼	55⅝	55⅜	56⅛	55⅜	....	....	....	....	56⅜	55⅞	35,505
Va.-Car Chem....	100	23	22¾	23¼	23	23⅛	23	....	....	....	....	23¼	....	2,980
Preferred.....	100	100	....	....	....	....	....	....	....	....	....	96	....	625

*Pittsburg exchanges; all others, New York. Total sales, 69,378.
‡Holiday. †Extra dividend.

COLORADO SPRINGS, COLO.

Company.	Par Val	June 25 H.	June 25 L.	June 27 H.	June 27 L.	June 28 H.	June 28 L.	June 29 H.	June 29 L.	June 30 H.	June 30 L.	July 1 H.	July 1 L.	Sales
Acacia.....	$1	7	6	6¾	6	....	....	8¼	6	6¼	6	6¾	6	2,000
Anaconda.....	5	14	12	14	12	....	....	16	12	12	....	16	12	....
Colo. City & M....	1	2⅜	2	2¼	1⅞	....	....	2¼	2	2¼	....	2	1⅜	1,000
C. K. & N.....	1	34	30	34	30	....	....	34½	32	33⅝	32½	34¼	32½	1,000
Cripple Ck. Con..	1	8	7⅜	8	7¾	....	....	7⅞	7⅛	7⅞	7⅜	7⅞	7¾	14,000
Des Moines.....	1	2¼	1⅝	2¼	1½	....	....	2¼	....	2¼	....	2¾	....	....
Doctor-Jack Pot..	1	4½	4¼	4½	4¾	....	....	4⅜	4¼	4⅜	4¼	4⅜	4¼	2,000
Elkton Con.....	1	70	68	70	68½	....	....	70	66	69	67½	68⅞	67⅜	5,500
El Paso.....	1	86¼	85½	86¼	85⅜	....	....	85⅞	85½	86	85¾	86	85¾	11,000
Gold Dollar Con..	1	4⅛	4⅛	5	4¾	....	....	5	4½	5	4	5	4⅛	1,000
Gold Sovereign...	1	6⅜	6⅛	6¼	6	....	....	6⅜	6⅛	6¼	6	6¼	6	3,000
Golden Cycle.....	1	45	40	45	40	....	....	....	....	....	....	60	....	....
Golden Fleece....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Hart.....	1	3¼	1	4	2½	....	....	4	2	4	2	....	....	....
Isabella.....	1	27	25	28½	25⅜	....	....	26	25	25¾	25	26½	25½	3,750
Jack Pot.....	1	6	4	6	4	....	....	6	4	6	4	6	4	500
Keystone.....	1	4⅜	4⅜	4⅜	4⅜	....	....	5	4⅜	5	4⅜	5	4⅜	1,000
Last Dollar.....	1	40	....	40	....	....	....	40	....	48	....	40	....	....
Lexington.....	1	3½	3	4	....	....	....	4⅛	3⅛	4	3½	4	3¼	500
Little Puck.....	1	3⅝	3½	3⅝	3⅝	....	....	3⅝	3½	4	3¼	3	....	2,000
Mollie Gibson....	1	5½	5	6	5	....	....	6	5	6	5	6	5	....
Moon-Anchor.....	5	8¼	7	8⅛	7	....	....	8⅛	7	8⅛	7	9	7	3,250
New Haven.....	5	3½	2¾	3½	2¾	....	....	3¼	2⅝	3¼	2⅞	3¼	2½	....
Old Gold.....	1	9½	9	9½	9⅛	....	....	9¾	9½	9⅝	9½	10	9	3,000
Pharmacist.....	1	3⅜	3⅛	3½	3	....	....	3⅜	3½	3½	3⅛	3½	3	2,000
Pinnacle.....	1	3	....	3	....	....	....	3	....	3	....	3	....	....
Portland.....	1	1.70	1.50	1.70	1.60	....	....	1.70	1.62	1.65	1.60	1.72½	1.60	600
Vindicator Con..	1	60	....	61	....	....	....	61¼	....	85	61	61	....	600
Work.....	1	7	6¾	7	6½	....	....	7	6⅝	7	6⅝	7	6⅝	....

Total sales, 59,700 shares.

SAN FRANCISCO.

Company.	Location.	June 23 H.	June 23 L.	June 24 H.	June 24 L.	June 25 H.	June 25 L.	June 27 H.	June 27 L.	June 28 H.	June 28 L.	June 29 H.	June 29 L.	Sale
Golden Anchor..	Nev..	30	....	30	25	37	28	30	....	35	31	32	28	6,800
MacNamara.....	Nev..	55	51	65	53	64	60	65	60	73	66	69	68	95,220
Mont. Tonopah..	Nev..	2.45	2.42½	2.50	2.47½	2.47½	....	2.50	2.47½	2.47½	....	2.50	2.45	5,000
Ton. Belmont....	Nev..	82	75	77	76	79	77	84	78	83	78	77	....	29,700
Ton. & Calif'nia	Nev..	....	....	....	....	....	....	....	....	....	....	....	....	....
Ton. Midway....	Cal..	52	50	60	52	60	54	58	56	60	59	67	61	29,700
Ton. Mg. Co.....	Nev.	7.87½	....	8.00	7.87½	....	....	8.12½	8.00	8.25	....	8.25	....	800
Ton. North Star.	Nev..	....	....	33	....	32	....	....	....	34	....	34	33	2,300
Ton. & Salt Lake	Nev..	....	....	....	....	....	....	....	....	....	....	....	....	....

Total sales, 169,670 shares.

COLORADO SPRINGS (By Telegraph).

Company.	*July 4 H.	*July 4 L.	July 5 H.	July 5 L.	Company.	*July 4 H.	*July 4 L.	July 5 H.	July 5 L.
Anaconda.....	....	....	....	....	Jack Pot.....	....	....	6	....
Cripple Ck. Con..	....	....	16	12	Last Dollar.....	....	....	40	....
C. K. & N.....	....	....	33⅜	32½	Mollie Gibson....	....	....	6	5
Doctor-Jack Pot..	....	....	4½	4⅜	Moon Anchor.....	....	....	8⅜	7
Elkton Con.....	....	....	68	67½	Old Gold.....	....	....	9	....
El Paso.....	....	....	85¾	85¾	Pharmacist.....	....	....	3¼	3
Gold Dollar Con.	....	....	4¾	4⅝	Portland.....	....	....	1.62½	1.60½
Gold Sovereign...	....	....	6¼	6	Vindicator.....	....	....	61	....
Isabella.....	....	....	26	25	Work.....	....	....	7	6½

*Holiday.

SAN FRANCISCO (By Telegraph).

Company.	June 29.	June 30.	Name of Company.	June 29.	June 30.
Belcher.....	20	12	Gould & Curry..	20	20
Best & Belcher..	1.25	1.30	Hale & Norcross..	64	64
Caledonia.....	59	57	Mexican.....	1.10	1.10
Challenge Con....	12	13	Ophir.....	3.10	3.10
Chollar.....	9	10	Overman.....	22	23
Confidence.....	80	80	Sierra Nevada..	37	35
Con. California & Virginia..	1.15	1.15	Union Con.....	37	36
Crown Point.....	12	13	Yellow Jacket..	21	20

PHILADELPHIA, PA

Company	Par val.	June 29 H.	June 29 L.	June 30 H.	June 30 L.	July 1 H.	July 1 L.	July 2* H.	July 2* L.	July 4* H.	July 4* L.	July 5 H.	July 5 L.	Sales
Am. Cement.....	10	8.00	....	....	....	....	....	....	....	....	....	....	....	261
Cambria Iron....	50	....	....	....	....	....	....	....	....	....	....	45¾	....	35
Cambria Steel....	50	19⅝	19⅜	19⅝	19⅜	19½	19⅜	....	....	....	....	19½	....	481
Int. Smokel's Pd.	100	15	....	13¾	....	....	....	....	....	....	....	....	....	150
Int Sm. Pd. Pfd.	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Lehigh C. & N...	50	80	79¼	80	....	80	79¾	....	....	....	....	80	79	2,645
Mont. Tonopah..	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Philadelphia....	50	38¾	....	39½	39	39½	....	....	....	....	....	39	38⅝	928
Phila. Pfd.....	50	44¼	....	....	....	....	....	....	....	....	....	44¼	....	106
Tonopah.....	100	8.50	8.00	8.19	8.06	8.25	8.06	....	....	8.50	8.00	....	....	....
Tonopah, Belm..	1	....	....	80	78	....	....	....	....	....	....	....	....	....
United Gas & C'l.	50	84¼	83¾	82⅝	....	82½	....	....	....	....	....	83½	83	1,034
Westmoreland C.	50	....	....	....	....	....	....	....	....	....	....	....	....	....

*Holiday. Total sales 5,640.

STOCK QUOTATION

ST. LOUIS, MO.* July 2.

Name.	Par Val.	Prices. Bid.	Ask.	Name.	Par Val.	Prices. Bid.	Ask.
Am.-Nettie, Colo....	$10	$0.11	$0.30	Columbia Lead, Mo.	$10	$3.50	$4.50
Catherine Lead, Mo.	10	1.00	2.00	Con. Coal, Ill.....	100	16.00	18.00
Central Coal & C....	100	59.53	61.25	Doe Run Lead Mo.	100	110.00	115.00
Central C. & C., pf..	100	70.00	72.50	Granite Bimet, Mt..	10	.50	.55
Central Lead, Mo...	100	110.00	115.00	St. Joe Lead, Mo,...	10	14.50	16.0

*By our Special Correspondent.

SALT LAKE CITY.* July 2.

Company	Par Val	High	Low	Sales.	Name of Company	Par Val	High	Low	Sales.
Butler Liberal.	1	12½	12⅜	250	May Day.....	¼	2⅜	3	12,400
Carisa.....	1	6	7	10,600	N. Y. Bonanza	1	3¾	3⅞	5,800
Century.....	1	63	77	1,500	Sacramento	5	13½	14¾	6,2 0
Con. Mercur...	5	22	24	1,900	Silver Shield ..	20	4¾	.....	17,500
Daly.....	...	2.25	2.50	600	Star Con.....	1	10	10½	1,500
Daly West....	1	23.00	23.60	140	Swansea.....	...	43	59	6,300
Daly Judge	20	3.75	4.45	425	South Swansea	...	.....	7¼	5,912
Emerald.....	...	.....	.02	1,000	Tetro.....	1	32½	34	2,400
Grand Central.	1	4.80	4.70	100	Tonopah Belm.	...	7½	7⅞	1,100
Montana Ton..	1	2.45	2.50	700	Uncle Sam, Con	1	.....	15⅜	4,600
MacNamara....	...	.55	.60	500	Victor.....	...	1½	1¾	2,500
Little Chief....	1	.....	.....	.....	Yankee Con ...	1	31	35	100
Mammoth.....	...	1.13	1.21	2,600	.....	...	.....	.....	.....

*By our Special Correspondent. All mines are in Utah. Total sales, 88,717 shares.

DULUTH, MINN. May 28.

Company	Par Val.	Bid.	Asked.	Company	Par Val.	Bid.	Asked.
Calumet & Arizona.....	$10	$100	$105	Lake Sup. & Pitts Dev..	$10	$145	$150
Calumet & Bisbee.....	10	3.00	4.50	Pitts. & Duluth Dev....	15	33.50	36.00
Calumet & Cochise.....	10	5.00	5.50	Shakespeare.....	10	.....	.20
Calumet & Pittsburg...	10	25.00	28.00	United Mexican.....	10	.....	.50
Higgins Development..	10	2.00	2.50	Wolverine & Arizona...	10	3.50	.....
Junction Development	15	18.00	21.00	Yaqui.....	10	.....	1.00

MONTREAL.* July 1.

Company	Par val.	Quotations High	Low	Sales	Company	Par val	Quotations High	Low	Sales
Dominion Coal.	100	44.75	40.25	1,535	Montreal Steel..	100	.....	.....	.....
Dom. Coal, Pf....	100	108.00	.....	45	Mont'l Steel, Pf.	100	.....	.....	.....
Dom. I. & St	100	7.75	7.00	535	Nova Scotia St..	100	71¾	67¾	1,150
Dom. I. & St..Pf.	100	22 13	20.00	393	N. S. Steel, Pf.,.	100	.....	.....	.....
Internat'l Coal..	100	100.00	.....	.....	Ogilvie.....	100	200.00	179.00	.....
Int'l Coal, Pf....	100	100.00	.....	.....	Ogilvie, Pf.....	100	1.17½	1.17	119

*Montreal Stock Exchange. Total sales, 3,777 shares.

MEXICO. June 23.

Company.	Shares Issued	Prices, Mex. Bid.	Ask.	Company.	Shares Issued.	Prices, Mex. Bid.	Ask.
Durango:				Trompillo.....	1,200	$1,800	$1,820
Ca. Min. de Penoles..	2,500	$2,700	$3,000	San Rafael y An., aviada.....	1,200	715	730
San Andres de la Sierra.....	200	10,000	.....	Soledad, aviada.....	670	745	760
Guanajuato:				Sorpresa, aviada.....	900	280	285
Angustias, Pozos....	2,400	40	45	**Mexico:**			
Cinco Senores y An., aviadoras.....	2,000	55	60	Alacran.....	2,400	20	28
Cinco Senores y An., aviada.....	400	55	60	Aldebarren.....	2,000	40	44
Providencia, San Juan de la Luz.....	6,000	58	62	Buen Despacho.....	3,000	58	85
Queensland y Australia.....	300	10	20	Dos Estrellas.....	3,000	2,080	2,100
Guerrero:				La Esperanza (El Oro.).....	3,000	1,500	1,500
Delfina, 1st serie.....	2,500	40	50	La Reformia, aviadores.....	2,000	33	38
Delfina, 2nd serie....	2,500	32	35	Santa Ana, Esperanza.....	2,400	.....	90
Garduno y Anexas...	7,200	35	40	**Michoacan:**			
Hidalgo:				Luz de Borda, aviadora.....	3,000	20	30
Amistad y Concordia	9,600	81	82½	Luz de Borda, aviado.....	1,000	10	15
Carmen, aviada.....	1,100	85	100	Santiago y An., Tlal..	4,000	8	10
Guadalupe Fresnillo Mill.....	1,000	170	200	**Nuevo Leon:**			
Guadalupe Fresnillo Mine.....	1,400	70	80	La Fraternal.....	1,000	580	620
La Reina y An., aviadora.....	5,600	2	3	Norias de Bajan.....	1,000	880	920
Luz de Maravillas, aviadas.....	1,100	.....	20	**San Luis Potosi:**			
Maravillas y An., aviador.....	1,680	110	150	Concepcion y An.....	3,000	50	60
Maravillas el Lobo ..	1,000	130	180	El Barreno, aviadora.	2,000	67	70
Palma y An., aviador.....	1,800	4	8	Sta. Maria de la Paz..	9,600	178	179
Refugio, aviada.....	12,800	680	740	San Diegoy Annexas.	2,400	8	10
Santa Anay An., aviadora.....	100	50	70	**Zacatecas:**			
Santa Anay An., aviada.....	600	25	35	Asturiana y An.....	2,500	45	50
Sta. Gertrudis y An., aviadas.....	9,600	13½	15	Candelaria y Pinos..	2,500	15	20
Sta. Gertrudis y An., aviadora.....	28,800	80¼	81¼	Esperanza y An.....	2,400	6	8
Santo Tomas Apostol aviadoras.....	5,100	2	3	Lourdes.....	2,500	21	25
San Felipe de Jesus, aviadora.....	3,600	15½	17	Luz de Minillas, pagadoras.....	2,000	.....	.....
San Felipe de Jesus, aviada.....	1,200	4	8	Nueva Quebradilla, aviadoras.....	2,400	25	40
San Rafael y An..				Nueva Quebradilla, aviadas.....	600	22	35
				San Carlos y Annexas	2,500	55	60
				Sta. Maria de Gaud..	2,500	80	85
				Miscellaneous:			
				Bartolome de Medina	2,000	96	100
				Naica (Chihuahua.)..	100	11,000	13,000
				Natividad (Oaxaca) aviadora.....	1,800	950	1,000
				San Francisco Hac...	6,000	73	75
				Union Hacienda.....	3,000	290	313

LONDON. June 24.

Company.	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Date.	Quotations. Buyers. £ s. d.	Sellers. £ s. d.
American:						
Alaska-Treadwell	200,000	5 0 0	1 6	Apr., 1904	4 7 6	4 12 6
Anaconda.....	1,200,000	5 0 0	2 0	May, 1904	3 12 6	3 15 0
Camp Bird.....	820,000	1 0 0	0 10	June, 1904	1 6 3	1 8 9
Copiapo.....	112,500	2 0 0	6 10	May, 1903	17 6	1 2 6
†De Lamar	80,000	1 0 0	1 6	May, 1904	12 6	15 0
El Oro.....	1,080,000	1 0 0	9	Jan., 1904	1 2 6	1 5 0
Esperanza.....	455,000	1 0 0	1 0	June, 1904		
Frontino & Bolivia.... .	128,662	1 0 0	3 0	July, 1901	6 3	8 9
Le Roi.....	200,000	5 0 0	5 0	Nov., 1899	13 9	16 3
Le Roi No. 2.....	120,000	5 0 0	1 0	June, 1904	15 0	16 3
Palmarejo & Mexican...	445,000	1 0 0	rts.	April, 1903	7 9	8 0
Standard.....	500,000	4 0	2½	Sept., 1903	2 6	3 6
Stratton Independence.	1,000,007	1 0 0	6	Dec., 1903	2 3	2 9
St. John del Rey.....	546,265	1 0 0	0	Dec., 1903	12 0	13 0
Tomboy.....	300,000	1 0 0	1 0	June, 1902	1 5 0	1 10 0
Ymir.....	200,000	1 0 0	1 0	Mar., 1902	1 3	3 9
European:						
Linares.....	15,000	3 0 0	5 0	Apr., 1904	3 5 0	3 15 0
Mason & Barry	185,172	1 0 0	7 0	May, 1904	2 17 6	3 2 6
Rio Tinto	325,000	5 0 0	37 6	May, 1904	52 7 6	52 12 6
Rio Tinto, preferred ...	325,000	5 0 0	2 6	May, 1904	6 0 0	6 5 0
Tharsis.....	625,000	2 0 0	7 0	May, 1904	4 12 6	4 17 6
West Australian:						
Associated	495,388	1 0 0	2 6	July, 1904	2 15 0	2 17 6
Cosmopolitan.....	400,000	1 0 0	1 0	Apr., 1904	10 0	10 6
Golden Horseshoe.....	300,000	5 0 0	6 0	Apr., 1904	7 3 9	7 6 3
Great Boulder.....	1,750,000	2 0 0	1 0	June, 1904	1 6 0	1 6 6
Gt BoulderPersever'ce	1,400,007	1 0 0	1 3	May, 1904	11 9	12 3
Great Fingall.....	250,000	1 0 0	7 0	July, 1904	7 15 0	7 17 6
Ivanhoe.....	200,000	5 0 0	7 6	Apr., 1904	7 13 9	7 16 3
Kalgurli	120,000	1 0 0	2 6	July, 1904	5 7 6	5 10 0
Lake View	250,000	1 0 0	rts.	Aug., 1902	1 3 9	1 6 3
Oroya-Brownhill.....	450,000	1 0 0	3 0	June, 1904	3 7 6	3 10 0
Miscellaneous:						
Brilliant Central	100,000	1 0 0	2 0	June, 1904	3 0 0	3 5 0
Briseis.....	600,000	1 0 0	.....	.....	8 0 0	8 6
Broken Hill.....	960,000	8 0	1 0	May, 1904	3 16 0	3 17 0
Mt. Lyell	275,000	3 0 0	1 3	June, 1904	13 0	14 0
Mt. Morgan.....	1,000,000	1 0 0	3	May, 1904	2 6 3	2 8 9
Waihi.....	497,412	1 0 0	4 6	June, 1904	5 8 9	5 11 3
Indian:						
Champion Reef..... .	513,832	10 0	1 3	May, 1904	1 12 6	1 13 9
Mysore.....	568,043	10 0	4 6	July, 1904	6 11 3	6 13 9
Nundydroog.....	484,000	10 0	1 8	Mar., 1904	1 13 5	1 14 7
Ooregum	343,000	10 0	1 3	Apr., 1904	1 0 0	1 1 3
Ooregum, pfd.....	240,000	10 0	1 3	Apr., 1904	1 10 0	1 12 6
South African:						
Angelo.....	600,000	1 0 0	7 0	July, 1904	7 2 6	7 5 0
Bonanza.....	200,000	1 0 0	10 0	Feb., 1904	1 6 3	1 8 9
British South Africa....	4,436,019	1 0 0	rts.	May, 1899	1 11 1	1 12 3
Cape Copper.....	300,000	2 0 0	2 6	July, 1904	3 2 6	3 7 6
Cape Copper, pfd.....	75,000	2 0 0	2 6	July, 1904	3 5 0	3 10 0
City & Suburban	340,000	4 0 0	4 0	Aug., 1904	6 7 6	6 12 6
Consol. Gold-Fields.....	2,000,000	1 0 0	.....	.....	6 12 6	6 17 6
Crown Reef.....	120,000	1 0 0	6 0	June, 1904	14 7 6	14 12 6
De Beers, preferred....	800,000	2 10 0	10 0	Jan.. 1904	18 8 9	18 11 3
De Beers, deferred.....	1,000,000	2 10 0	12 6	July, 1904	18 17 6	19 0 0
East Rand.....	990,000	1 0 0	5 0	July, 1903	7 12 6	7 13 9
Ferreira.....	90,000	1 0 0	22 6	Aug., 1904	20 15 0	21 5 0
Geldenhuis	200,000	1 0 0	7 0	Aug., 1904	5 10 0	5 12 6
Geduld.....	400,000	1 0 0	rts.	Mar., 1902	6 3 9	6 6 3
Henry Nourse.....	125,000	1 0 0	8 0	Aug., 1904	8 7 6	8 12 6
Jubilee.....	50,000	1 0 0	5 0	Aug., 1904	4 12 6	4 17 6
Jumpers.....	100,000	1 0 0	2 6	May, 1904	2 17 6	3 2 6
Langlaagte.....	470,000	1 0 0	2 0	Aug., 1904	3 15 0	3 17 6
May.....	288,750	1 0 0	3 0	Aug., 1904	3 18 9	4 1 3
Meyer & Charlton.....	100,000	1 0 0	5 0	July, 1904	5 7 6	5 12 6
Modderfontein	200,000	1 0 0	rts.	Apr., 1902	8 13 9	8 16 3
Namaqua.....	94,331	2 0 0	3 0	Dec., 1903	2 15 0	3 0 0
New Jagersfontein..	200,000	5 0 0	10 0	June, 1904	28 0 0	28 10 0
New Primrose.....	325,000	1 0 0	3 0	Aug., 1904	3 13 9	3 18 3
Rand.....	1,795,958	5 0 0	5 0	Aug., 1902	10 5 0	10 6 3
Robinson.....	750,000	5 0 0	6 0	Aug., 1904	9 16 0	9 12 6
Robinson Deep.....	950,000	1 0 0	3 0	Aug., 1904	5 8 9	5 11 3
Rose Deep	425,000	1 0 0	3 0	Aug., 1904	8 15 0	9 0 0
Salisbury	100,000	1 0 0	2 0	June, 1904	1 15 0	2 0 0
Village.....	400,000	1 0 0	4 0	July, 1904	5 0 0	5 5 0
Wemmer.....	80,000	1 0 0	12 6	June, 1904	11 0 0	11 10 0

LONDON (By Cable.)*

Company.	June 29 £. s. d.	June 22 £. s. d.	Company.	June 29 £. s. d.	June 22 £. s. d.
Anaconda.....	3 15 0	3 15 0	†Esperanza.	1 1 3	‡1 0 6
Camp Bird.....	†1 6 3	1 7 3	Modderfontein....	8 11 3	8 13 9
Con. Gold Fields.	6 7 6	6 7 6	Rand Mines.....	10 6 39	10 6 3
De Beers.....	19 2 6	13 2 6	Rio Tinto	52 2 6	53 5 0
East Rand.....	7 12 6	7 13 1½	Simmer & Jack...	1 12 6	1 12 6
El Oro.....	1 3 1½	1 3 9	Tomboy.....	1 5 0	1 3 9

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.
†Stock Exchange settlement has been granted for July 6. ‡Cumulative dividend.

PARIS. June 16.

Company.	Location.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Closing. Fr.
Anzin, Coal.....	France	.....	.....	290.00	5,525.00	5,524.00
Boleo, c.....	Lower Cal.....	12,000,000	500	104.17	1,940.00	1,873.00
Champ d'Or, g.....	S. Africa.....	3,375,000	25	3.75	19.75	18.75
Courrieres, Coal.....	France	600,000	500	110.00	2,900.00	2,880.00
Fraser River, g.....	Brit. Col.....	250,000	25	.....	5.50	5.50
Huanchaca, s.....	Bolivia.....	40,000,000	125	2.50	79.50	88.75
Laurium, z. l.....	Greece.....	16,300,000	500	25.00	290.00	318.00
Malfidano, z.....	Italy	12,500,000	500	50.00	582.00	590.00
Metaux, Cie. Fran. de.....	France	25,000,000	500	22.50	474.00	469.00
Mokta-el-Hadid, i. l.....	Algeria	18,312,000	500	40.00	870.00	868.00
Nickel, n.....	N. Caledonia..	15,000,000	250	22.50	538.50	580.00
Penarroya, Coal	Spain.....	.....	500	45.00	1,058.00	1,052.00
Vielle Montagne z.....	Belgium..	9,000,000	30	30.00	685.00	680.00
.....	.....	.....	.....	.....	.....	.....

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.

DIVIDENDS.

GOLD, SILVER, COPPER, LEAD, QUICKSILVER AND ZINC COMPANIES.—UNITED STATES.

Name and Location of Company.		Author-ized Capital.	Shares. Issued.	Par Val	Dividends. Paid in 1904	Total to Date	Latest. Date.	Amt.
Acacia, g.	Colo..	$1,500,000	1,433,000	$1	.....	$57,560	Apr.. 1903	$0.01
Adams, s. l. c	Colo..	1,500,000	150,000	10	.....	738,500	Oct.. 1902	.05
Aetna Con., q.	Cal....	500,000	10 ,000	5	.....	325,000	Apr.. 1900	.15
Alaska-Mexican, g ..	Alaska.	1,000,000	180,000	5	$54,000	627,381	Mar.. 1904	.20
Alaska-Treadwell, g.	Alaska.	5,000,000	200,000	25	225,000	5,270,000	Apr.. 1904	.37½
Amalgamated, c	Mont..	155,000,000	1,530,879	100	1,538,380	24,273,267	May.. 1904	.50
Am. Sm. & R-f. com	U. S..	50,000,000	500,000	100	1,875,000	1,875,000	July. 1904	1.25
Am. Sm. & Ref., pf..	U. S..	50,000,000	502,000	100	2,625,000	15,046,553	July. 1904	1.75
Anaconda, c	Mont..	30,000,000	1,200,000	25	600,000	23,850,000	May.. 1904	.50
Annie Laurie, g.....	Utah ..	5,000,000	25,000	100	87,500	342,500	June. 1904	.50
Arizona, c.....	Ariz..	3,775,000	.....	...	664,786	5,333,044	May.. 1904	.....
Bald Butte, g. s.....	Mont..	250,000	200,000	1	25,000	1,337,148	Jan.. 1903	.12½
Big Six., s. l.....	Colo..	500,000	500,000	1	.....	17,500	Nov.. 1903	.00½
Bonanza King, g.....	Colo..	1,000,000	1,000,000	1	5,000	5,000	Feb.. 1904	.00½
Boston & Colo. Sm.	Colo..	750,000	15,000	50	.....	402,350	Oct.. 1902	.75
Boston & Mont.....	Mont..	3,750,000	150,000	25	300,000	28,625,000	Jan.. 1904	2.00
Breece, l. s.....	Colo..	5,000,000	200,000	25	.....	200,000	June. 1904	.05
Bunker Hill & Sull..	Idaho .	3,000,000	300,000	10	288,000	1,814,000	June. 1904	.25
Butler-Liberal, g. s..	Utah ..	500,000	500,000	1	.....	2,500	Dec.. 1903	.00½
Butte & Boston, c....	Mont..	2,500,000	200,000	25	200,000	1,800,000	Feb.. 1904	1.00
Calumet & Arizona, c	Ariz ...	2,500,000	200,000	10	660,000	1,000,000	June. 1904	1.50
Calumet & Hecla, c..	Mich ..	2,500,000	100,000	25	2,000,000	85,350,000	June. 1904	10.00
Camp Bird, g.....	Colo..	5,500,000	820,000	5	492,000	1,459,704	June. 1904	.24
Cashier.....	Colo..	1,000,000	900,000	1	8,340	26,160	Apr.. 1904	.00½
Center Creek, l. z ..	Mo..	1,000,000	100,000	10	10,000	140,000	Apr.. 1904	.10
Central Eureka, g....	Cal....	4,000,000	398,425	10	51,804	287,785	June. 1904	.02
Central, l.....	Mo....	1,000,000	10,000	100	20,000	405,000	June. 1904	.50
Century, g. s. l.....	Utah ..	150,000	150,000	1	15,000	27,000	June. 1904	.02
Champion, c.....	Mich ..	2,500,000	100,000	25	.....	100,000	May.. 1903	1.00
C. K. & N., g.....	Colo..	1,500,000	1,431,900	1	57,276	128,871	June. 1904	.01
Clinton, g. s.....	Colo..	100,000	1,000	100	.....	60,000	Dec.. 1902	.30
Con. Mercur, g.....	Utah ..	5,000,000	1,000,000	5	.....	1,030,000	May.. 1903	.03
Continental, g.....	Mo....	550,000	22,000	25	8,800	61,800	Jan.. 1904	.40
Daly-West, g. s. l...	Utah	3,800,000	180,000	20	612,000	4,103,000	June. 1904	.40
De Lamar, g. s.....	Idaho ..	400,000	67,180	5	24,184	2,764,524	May.. 1904	.35
Deadwood-Stand. pf.	So. Dak	600,000	600,000	1	.....	6,000	Dec.. 1903	.01
Doe Run, l	Mo....	1,500 000	15,000	100	45,000	672,072	Apr.. 1904	1 50
Elkton Con., g	Colo...	3,000 000	2,500,000	1	.....	1,401,461	Mar.. 1902	.04
El Paso, g.....	Colo...	2,500,000	2,450,000	1	85,750	250,050	May.. 1904	.01
Federal Sm., com....	Idaho..	10,000,000	87,500	100	78,750	78,750	July. 1904	1.50
Federal Sm.,pf.....	Idaho .	20,000,000	105,000	100	367,500	551,250	July. 1904	1.75
Gemini, g. s. l.....	Utah ..	500,000	5,000	100	50,000	1,100,000	Mar.. 1904	10.00
Gold Coin, g.....	Colo..	1,000,000	1,000,000	1	.....	1,230,000	Jan.. 1903	.01
Gold King, ...	Colo..	1,000,000	936,850	1	14,053	473,109	Jan.. 1904	.01½
Golden Cycle, g....	Colo...	2,000,000	1,500,000	1	.....	393,750	Aug.. 1903	.03
Good Hope, g, s	Colo...	50,000	500	100	.....	941,250	Jan.. 1903	.25
Grand Central, g....	Utah ..	250,000	250,000	1	125,000	1,016,250	June. 1904	.10
Gwin, g.....	Cal....	1,000,000	100,000	10	.....	426,500	Dec.. 1902	.15
Hecla, s. l.....	Idaho .	250,000	1,000,000	½	30,000	150,000	May.. 1904	.01
Hecla Con., s. l.....	Mont..	1,500,000	30,000	50	.....	2,930,550	Apr.. 1902	.25
Hercules-Horsh'e, g.	Cal....	1,000,000	340,000	1	2,250	2,250	June. 1904	.00¼
Homestake, g	So. Dak	21,840,000	218,400	100	327,600	12,695,350	June. 1904	.25
Horn Silver, g. s.c.z.l	Utah ..	10,000,000	400,000	25	40,000	5,402,000	June. 1904	.05
Internat. Nickel, pf.	U. S....	12,000,000	87,415	100	.....	349,660	May.. 1903	10.00
Iowa, g. s. l.....	Colo..	1,666,667	1,666,667	1	33,334	370,171	Apr.. 1904	.01
Iron Silver.....	Colo..	10,000,000	500,000	20	150,000	3,000,000	June. 1904	.10
Jamison, g.....	Cal....	3,000,000	300,000	10	23,400	144,300	Apr.. 1904	.03
Kendall, g.....	Mont..	2,500,000	500,000	5	175,000	480,000	June. 1904	.05
La Fortuna, g.....	Ariz..	250,000	250,000	1	.....	1,062,500	Oct.. 1902	.05
Last Dollar, g.....	Colo..	1,500,000	1,500,000	1	.....	240,000	Mar.. 1903	.02
Liberty Bell, g.....	Colo..	700,000	130,349	1	39,104	130,337	Apr.. 1904	.15
Lightner, g.....	Cal	125,000	102,255	1	30,678	217,293	June. 1904	.05
Lyon, z. l.....	Mo....	50,000	4,000	10	1,200	1,200	Apr.. 1904	.30
Mary McKinney, g..	Colo..	1,000,000	1,000,000	1	30,000	530,030	Apr.. 1904	.03
May Day, g.....	Utah ..	100,000	400,000	¼	.....	30,000	Mar.. 1902	.01
Mine La Mott, l.....	Mo....	3,300,000	300,000	10	60,000	300,000	Jan.. 1904	.20
Mines Co. of Am....	U. S....	2,000,000	2,000,000	1	150,000	695,000	June. 1904	.01½
Modoc, g. s	Colo..	500,000	500,000	1	.....	270,000	Dec.. 1903	.01
Mont. Ore Purch....	Mont..	2,500,000	81,000	25	324,000	3,618,300	Apr.. 1904	4.00
Mont.-Tonopah, g...	Nev ...	1,000,000	885,000	1	.....	42,750	Dec.. 1903	.05
Mountain, c.....	Cal	6,250,000	250,000	25	.....	3,776,250	May.. 1903	1.57
Napa Con., q.....	Cal	700,000	100,000	7	.....	1,180,000	Oct.. 1902	.10
Nat. Lead, pf.....	U. S....	15,000,000	149,040	100	521,640	14,493,808	June. 1904	1.75
Nevada Keystone, g.	Nev....	1,000,000	638,877	1	19,166	61,700	Feb .. 1904	.03
New Century, z	Mo....	150,000	150,000	1	3,750	3,750	May .. 1904	.01
New Idria, q.....	Cal	500,000	100,000	5	120,000	640,060	July .. 1904	.30
New Jersey, z.....	U. S....	10,000,000	100,000	100	660,000	6,600,000	May.. 1904	3.00
New Lead. Home....	Colo..	2,000,000	2,000,000	1	.....	265,500	Feb.. 1902	.00⅝
North Star, g	Cal....	2,500,000	250,000	10	.....	706,356	Dec.. 1903	.50
Northern Light, g. s.	Utah..	2,000,000	400,000	5	20,000	20,000	Feb.. 1904	.05
Old Gold, g.....	Colo..	2,101,150	2,101,150	1	10,506	10,506	Mar.. 1904	.00½
Ontario. s. l.....	Utah ..	15,000,000	150,000	100	.....	14,917,030	Dec.. 1902	.30
Ophir, g s.....	Nev....	302,400	100,800	3	196,650	1,772,200	June. 1904	.25
Osceola, c.....	Mich ..	2,500,000	96,150	25	192,300	4,439,600	May.. 1904	1.00
Oustomah, g	Cal....	250,000	250,000	1	12,500	12,500	Mar.. 1904	.05
Parrot, c.....	Mont..	2,300,000	229,850	10	.....	5,772,935	Jan.. 1902	.02
Pennsylvania, g....	Cal....	5,150,000	51,500	100	25,900	217,975	June. 1904	.10
Portland, g.....	Colo..	3,000,000	3,000,000	1	360,000	5,017,080	Apr.. 1904	.06
Quicksilver, pf.....	Cal	4,300,000	43,000	100	.....	1,931,411	May .. 1903	.50
Quilp, g.....	Wash..	1,500,000	1,500,000	1	15,000	15,000	Apr.. 1904	.01
Quincy, c.....	Mich ..	2,500,000	100,000	25	250,000	14,370,000	Feb,. 1904	2.50
Red Bird, g. s. c. l,	Mont..	1,500,000	300,000	5	.....	36,000	Dec.. 1903	.01
Rob Roy, g.....	Mo	15,000	13,825	1	692	2,945	May.. 1904	.03
Rocco Homestake, l.s	Nev....	300,000	300,000	1	4,000	94,000	Jan.. 1904	.01⅔
Sacramento, g.....	Utah ..	5,000,000	1,000,000	5	15,000	208,000	July.. 1904	.00½
St. Joseph, l.....	Mo	6,000,000	375,000	10	112,500	3,947,000	June. 1904	.15
Silver Hill, g. s.....	Nev....	180,000	180,000	1	18,000	46,800	Mar.. 1904	.05
Silver King, g. s. l..	Utah ..	3,000,000	150,000	20	600,000	7,950,000	June. 1904	.60⅔
Smuggler, s. l. z.....	Colo..	1,000,000	1,000,000	5	.....	2,175,000	Feb.. 1902	.01
South Swansea.....	Utah...	300,000	300,000	1	3,000	168,000	Apr.. 1904	.01
Spearfish, g. pf.....	So. Dak	1,000,888	882,000	1	4,410	101,430	May.. 1904	.00½
Specie Payment, g..	Colo..	1,000,000	1,000,000	1	.....	65,190	Oct.. 1903	.01
Standard Con., g. s..	Cal....	2,000,000	178,394	10	35,678	1,213,848	May.. 1904	.10
Standard, c.....	Ariz..	500,000	500,000	1	.....	40,000	Sept. 1903	.05
Stratton's Independ.	Colo..	5,500,000	1,000,007	5	.....	4,130,800	Dec.. 1903	.12½
Swansea, s. l.....	Utah ..	500,000	100,000	5	.....	330,500	June 1902	.05
Tamarack, c.....	Mich ..	1,500,000	60,000	25	90,000	8,580,000	Jan.. 1904	1.50
Tennessee c.....	Tenn..	5,000,000	175,000	25	218,750	437,500	Jan.. 1904	1.25
Tetro, gs., l.....	Utah...	300,000	300,000	1	3,003	3,000	June 1904	.01
Tomboy, g. s	Colo..	1,500,000	300,000	5	.....	1,244,000	July.. 1902	.24
Tonopah-Alpine, g.	Nev....	700,000	700,000	1	.....	70,000	Dec.. 1903	.10
Town Topics. g. s....	Colo..	1 000,000	1,000,000	1	.....	50,000	Nov.. 1903	.00½
Trinity County, g..	Cal	1,000,000	99,003	10	.....	34,561	July. 1903	.05
United, (Creede) g..	Colo..	500,000	500,000	1	10,030	55,000	Mar.. 1904	.02
Union, g.....	Colo..	1,250,000	1,250,000	1	.....	445,244	Jan.. 1903	.02
United,c. pf.....	Mont..	5,000,000	50,000	100	150,000	600,000	May .. 1904	3.00
United, z. l.,com....	Mo	5,000,000	78,900	5	.....	30,725	Oct .. 1903	.05
United, z. l. pf	Mo	1,000,000	18,998	25	18,998	144,254	July.. 1904	.50
United Verde, c.....	Ariz..	3,000,000	300,000	10	1,350,000	16,410,322	June. 1904	.75
U. S. Red.& Ref., com	Colo..	6,000,000	59,188	100	.....	414,078	Oct.. 1903	1.00
U. S. Red. & Ref., pf.	Colo..	4,000,000	39,458	100	.....	472,821	Oct .. 1903	1.50
United States, g. s. c.	Utah ..	21,500,000	420,000	25	210,000	210,000	Aug.. 1904	.50
Utah, g.....	Utah ..	1,000,000	100,000	10	4,000	225,000	June. 1904	.01
Utah Con., c.....	Utah ..	1,500,000	300,000	5	300,000	2,586,000	July.. 1904	1.50
Vindicator Con., g...	Colo..	1,500,000	1,100,000	1	33,000	1,148,000	Apr .. 1904	.03
Waldorf, g.....	Colo..	3,000,000	3 000,000	1	.....	47,000	July. 1903	.00¼
Wasp No. 2, g.....	So. Dak	500,000	147,900	1	11,832	230,242	Apr .. 1904	.03
Wolverine, c.....	Mich ..	1,500,000	60,000	25	210,000	1,530,000	Apr.. 1904	3.50
Yellow Aster, g	Cal	1,000,000	100,000	10	30,360	583,789	Feb.. 1904	.15

COAL, IRON AND OTHER INDUSTRIALS.

Name and Location of Company.		Author-ized Capital.	Shares. Issued.	Par Val	Dividends. Paid in 1904	Total to Date.	Latest. Date.	Amt.
Ala. Con., C. & I., pf	Ala	$2,500,000	$24,638	$100	$86,234	$775,914	June. 1904	$1.75
Ala. & Ga. Iron, pf..	Ala.....	650,000	6,500	100	.....	6,500	Jan . 1903	1.00
Allis-Chalmers, pf ..	U. S....	25,000,000	200,000	100	350,000	3,213,750	Feb.. 1904	1.75
Alma Oil.....	Cal....	400,000	380,000	1	.....	45,600	Dec.. 1903	.03
Amer.Agr.Chem.,pf..	U. S....	20,000,000	181,350	100	544,050	5,214,810	Apr.. 1904	3.00
American Cement...	Pa	2,000,000	200,000	10	160,000	700,000	July. 1904	.40
American Coal.....	Md	1,500,000	50,000	25	62,500	1,495,060	Mar.. 1904	1.25
Aztec Oil.....	Cal	250,000	235,000	1	.....	43,050	Sept. 1903	.03
Bon Air C. & I., pf...	Tenn ..	2,500,000	18,803	100	56,410	193,346	Apr.. 1904	1.50
Cambria Steel.....	Pa	50,000,000	900,000	50	675,000	7,125,000	Feb.. 1904	.75
Central C. & C.,com.	Mo	5,125,000	51,250	100	230,625	781,875	July . 1903	1.50
Central C. & C., pf..	Mo	1,875,000	18,750	100	70,311	867,183	July . 1904	1.25
Central Oil	W. Va .	1,500,000	60,000	25	30,000	182,500	May . 1904	.25
Colo. Fuel & I., com	Colo..	38,000,000	239,310	100	.....	1,642,500	Apr.. 1902	1.75
Colo. Fuel & I,. pf ..	Colo..	2,000,000	20,000	100	.....	1,560,000	Feb.. 1903	4.00
Colum. & Hock. C.&I	Ohio..	7,000,000	69,244	100	51,933	138,464	Aug.. 1904	.25
Consolidated Coal...	Ill	5,000,000	50,000	100	100,000	400,000	Apr .. 1904	1.00
Consolidation Coal..	Md	10,250,000	102,500	100	410,000	6,946,650	Feb.. 1904	4.00
Crucible Steel, pf ...	U. S....	25,000,000	250,000	100	.....	5,250,000	Sept. 1903	1.75
Cummings Cement..	N. Y....	300,000	3,000	100	.....	216,000	July . 1903	9.00
Dabney Oil.....	Cal	1,000,000	1,000,000	1	37,500	182,500	Feb.. 1904	.03¾
Empire S.. & I., pf ..	U. S....	5,000,000	23,700	100	44,550	611,900	July. 1904	1.50
Fairmont Coal.....	W. Va..	12,000,000	120,000	100	240,000	240,000	Feb.. 1904	2.00
Four Oil.....	Cal	300,000	208,700	1	14,609	74,971	July. 1904	.01
General Chem., com	U. S....	12,500,000	74,103	100	.....	1,300,517	Dec.. 1903	1.25
General Chem., pf...	U. S....	12,500,000	100,000	100	450,000	3,025,178	July. 1904	1.50
Giant Oil.....	Cal	800,000	800,000	1	.....	144,000	Jan.. 1903	.02
Higgins Oil.....	Tex	2,500,000	17,000	100	.....	96,850	Apr.	1.50
Home Oil.....	Cal	100,000	100,000	1	5,000	497,500	June. 1904	.02½
Houston Oil, pf.....	Tex	7,500,000	75,000	100	.....	896,500	Feb . 1903	3 00
Imperial Oil.....	Cal	1,000,000	100,000	100	140,000	640,000	July . 1904	.20
Int'l Acheson, pf....	N. Y....	500,000	5,000	100	.....	105,000	July. 1903	3.50
Jeff.& Cl'f. C.&I.com.	Pa	1,500,000	15,000	100	.....	180,000	Aug . 1903	5.00
Jeff.& Cl'f. C. & I,. pf.	Pa	1,500,000	15,000	100	37,500	638,000	Feb.. 1904	2 50
Lehigh Coal & Nav..	Pa	14,346,650	286,933	50	502,133	21,543,582	May.. 1904	1 75
Maryland Coal, pf...	Md	2,000,000	18,850	50	65,975	1,112,110	June. 1904	3 00
Monong. R. Coal, pf	Pa	10,000,000	97,300	100	347,165	3,124,485	Jan.. 1904	3.50
Monte Cristo Oil....	Cal	500,000	500,000	1	20,000	55,000	June. 1904	.01
National Carbon. pf..	U. S....	4,500,000	45,000	100	157,500	1,732,500	May . 1904	1.75
New Central Coal..	Md....	1,000,000	50,000	20	20,000	270,000	Mar.. 1904	.40
Ohio & Ind. Gas.....	U. S....	10,000,000	900,000	100	.....	1,440,000	Dec.. 1903	1.00
Oil City Petroleum.	Cal	500,000	500,00	1	10,000	10,000	July . 1904	.00½
Pacific Coast Borax..	Cal	2,000,000	19,000	100	288,000	1,820,500	June. 1904	1.00
Peerless Oil.....	Cal	1,000,000	92,000	10	77,200	287,600	June. 1904	.14
Penna. Salt	Pa	3,000,000	60,000	50	180,000	13,630,000	Apr.. 1904	3.00
Penna. Steel	Pa	25,000,000	168,214	100	588,749	4,004,499	May . 1904	3.50
Phila. Gas, com.....	Pa	28,363,029	579,031	50	1,186,864	4,613,495	Aug.. 1904	.75
Phila. Gas, pf.....	Pa	5,744,813	114,896	50	287,212	1,439,885	June. 1904	1.25
Pittsburg Coal, pf...	Pa	32,000,000	297,012	100	1,039,542	9,355,878	Apr .. 1904	1.75
Pittsburg Oil.....	Cal	300,000	240,000	1	.....	48,000	Dec.. 1903	.02½
Pocahontas Coll., pf	W. Va..	1,500,000	15,000	100	45,000	235,000	June. 1904	.50
Rep. Iron & Steel, pf	U. S....	25,000,000	204,169	100	.....	6,053,476	Oct.. 1903	1.75
San Joaquin Oil.....	Cal	100,000	100,000	1	440.000	625,000	Mar.. 1904	2.20
Shelby Iron.....	Ala	1,000,000	10,000	100	.....	840,000	Nov . 1903	5.00
Sloss-Sheffield, pf..	Ala	20,000,000	67,000	100	351,750	2,087,750	July . 1904	1.75
Somerset Coal	Pa	4,000,000	40,000	100	80 000	80,000	Feb . 1904	2.00
St. Bernard C. & C...	Ky-Ten.	1,000,000	10,000	100	.....	770,000	Dec.. 1903	6.00
Standard Oil.....	U. S....	100,000,000	970,000	100	23,280,000	231260,000	June. 1904	8.00
SundayCreek Coal,pf	Ohio ..	1,500,000	15,000	100	.....	15,750	Aug.. 1903	3.00
Susq.I. & S., pf.....	Pa	1,500,000	300,000	5	.....	762,500	June 1903	3 15
Temple Iron.....	Pa	240,000	2,400	100	.....	21,500	July. 1903	2.00
Tenn. C. I., com.....	Tenn ..	23,000,000	225,537	100	.....	1,102,600	Nov. 1900	2.00
Tenn. C. I., pf.....	Tenn ..	248,000	2,480	100	14,880	321,984	Aug.. 1904	2 00
Thirty-three Oil.....	Cal	500,000	100,000	5	70,000	310,000	July . 1904	.10
Thomas Iron.....	Pa	2,500,000	25,000	200	.....	200,000	Aug . 1903	4.00
Tidewater Steel, pf ..	Pa	600,000	60,000	1	.....	30,000	July . 1903	.20
Union Oil.....	Cal	10,000,000	52,672	100	73,740	889,682	Apr .. 1904	.70
Union Nat'l Gas.....	Pa	8,000,000	22,500	100	135,000	315,000	July . 1904	2.00
U. S. Steel Corp., com	U. S....	550,000,000	5,083,025	100	.....	53,360,978	Dec.. 1903	1 50
U. S. Steel Corp., pf.	U. S....	360,281,100	3,602,811	100	12,610,984	105,487,897	May . 1904	1.75
Va.-Carolina Ch.,com	U. S....	38,000,000	279,844	100	.....	3,678,829	June. 1903	1 25
Va.-Carolina Ch., pf.	U. S....	20,000,000	180,000	100	840,000	7,830,869	July . 1904	2.00
Westmoreland Coal.	Pa	3,000,000	60,000	50	.....	8,250,000	Sept.	.50
West Shore Oil.....	Cal	100,000	100,000	1	15,000	120,000	June. 1904	.05
.....	.....	.....	.....	.....	.....	.....	.....	.....

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Name and Location of Company.		Author-ized Capital.	Shares. Issued.	Par val	Dividends. Paid in 1904.	Total to Date.	Latest. Date.	Amt.
Amistad y Concordia	Mex....	$480,000	9,600	$50	$45,408	$210,624	Apr .. 1904	$1.88
Barreno, g. s.....	Mex....	12,000	2,400	5	4,236	68,182	June. 1904	.89
Bart. de Medina Mill	Mex....	50,000	2,000	25	10,583	90,311	June. 1904	.67
Buena Vista, g. s....	Mex....	100,000	1,000	100	.....	5,000	June. 1903	5.00
Butters' Salvador, g.	Salv ..	750,000	150,000	5	72,000	324,000	June. 1904	.24
Cariboo McKin'y,g.s.	B. C....	1,250,000	1,250,000	1	50,000	548,837	Feb.. 1904	.04
Carmen, g, s.....	Mex....	27,500	1,100	25	.....	78,616	Nov . 1894	.80
Carmen-Guanaj. g. s.	Mex....	725,000	145,000	5	.....	27,750	Oct . 1903	.12½
Cinco Senores.....	Mex....	.....	2,000	.....	.....	711 935	July. 1903	4.10
Copiapo c.....	Chile .	1,125,000	112,500	10	.....	2,865,900	Feb.. 1904	.36
Crow's Nest Pass	N. S..	3,500,000	121,486	25	172,524	968,947	Apr .. 1904	2.50
Dominion Coal, com.	N. S..	15,600,000	150,000	100	.....	1,050,000	Dec .. 1903	1.75
Dominion Coal. pf..	N. S..	3,000,000	30,000	100	120,000	2,400,000	July . 1904	4.00
Dominion I. & S. pf.	N. S..	5,000,000	50,000	100	.....	875,000	Sept. 1903	3.50
Dos Estrellas, g. s...	Mex'..	150,000	3,000	50	79,350	662,175	June. 1904	4.40
El Oro, g. s	Mex....	5,750,000	1,080,000	5	.....	2,514,400	Dec.. 1903	.18
Esperanza, s. g.....	Mex....	2,275,000	455,000	5	113,750	1,287,949	June. 1904	.25
Fraternal, s.....	Mex	5,000	1,000	5	.....	51,263	Nov . 1903	2.18
Granby Con.....	B. C.	13,363,030	1,333,303	10	.....	133,630	Dec.. 1903	.10
Greene Con., c.....	Mex....	8,640,000	864,000	10	518,400	1,170,220	Aug . 1904	.30
Guadalupe	Mex....	1,000,000	10,000	100	.....	3,515,750	Apr.. 1903	.77
Guggenheim Expl...	Mex	17,000,000	105,000	100	551,250	1,102,500	July . 1904	1.75
Le Roi No. 2. g.....	B. C ..	3,000,000	120,000	35	57,600	345,600	June. 1904	.24
Mesquital, g. s.....	Mex....	125,000	250,000	½	.....	51,458	Feb.. 1903	.06
Mex. Coal & Coke...	Mex....	5,000,000	50,000	100	150,000	130,000	June. 1904	3.00
Natividad, s. g.....	Mex....	36,000	2,400	15	72,000	344,463	June. 1904	5.00
N. Y. & Hond. Ros...	C. A ..	1,500,000	150,000	10	60,000	1,845,000	June. 1904	.10
N. S. St. & Coal, com.	N. S..	5,000,000	50,000	100	123,600	638,600	Apr .. 1904	3.00
N. S. St. & Coal, pf..	N. S..	2,000,000	10,300	100	41,200	247,200	Apr .. 1904	2.00
Penoles, s. g.....	Mex....	125,000	2,500	50	268,000	2,756,114	June. 1904	17.60
Providence. g. s.....	B. C....	200,000	40,300	5	4,000	6,224	June. 1904	.10
Providencia (S. J.)..	Mex....	90,000	6,000	15	.....	169,740	Feb.. 1903	.77
Real del Monte, ...	Mex....	.....	2,554	...	11,238	2,938,122	Jan.. 1904	4.40
San Francisco Mill..	Mex....	150,000	6,000	25	2,760	289,920	June. 1904	.46
Soledad, s. l.....	Mex....	18,200	960	20	27,670	292,312	June. 1904	6.75
Sorpressa, g. s.....	Mex....	18,200	960	20	12,732	212,788	June. 1904	2.25
San Rafael.....	Mex....	60,000	2,400	25	139,505	2,176,022	June. 1904	.....
Sta. Gertrudis, g. s..	Mex....	1,920,000	38,000	50	50,688	2,830,848	May.. 1904	.....
St. John del Rey, g..	Brazil .	3,000,000	546,265	5	.....	14,158,949	Dec.. 1903	.12
Sta. Maria de la Paz.	Mex....	.....	2,400	...	21,370	1,983,743	June. 1904	2.30
Torreon Metallurg'l	Mex....	1,500,000	30,000	50	.....	269,500	May.. 1903	8.98
Tyee, c.....	B. C....	940,000	180,000	5	43,200	43,200	Apr .. 1904	.24
Union Mill.....	Mex....	150,000	3,000	50	16,170	429,583	May.. 1904	1.79

NOTE.—These dividends are published gratuitously. Readers are invited to send any additions or corrections which they think necess